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I.

SYSTEMIC INFECTION OF MIDDLE EAR ORIGIN IN THE EXANTHEMATA.*

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In order that we may better understand systemic infection of middle ear origin, let us briefly consider the specific infection, or toxemia, which is more or less a fundamental part of the three common diseases of the exanthemata.

Measles have been proven to be a bacteremial disease by experiments upon animals, but whether or not toxins are produced is as yet unknown. It is rarely a true systemic infection, though certain predisposing influences may give rise to a streptococcus or staphylococcus general infection. The striking peculiarity of the disease is its tendency to attack or involve mucous membranes, especially those exposed to the air. In severe cases this may amount to a definite injury to the vitality of the tissue. That very destructive disease, noma, is largely due to this specific action of measles upon mucous membranes, and is rarely seen except as a complication of this illness.

*Read before the New York Academy of Medicine, Section on Otology, October 9, 1914.

Diphtheria is a local infection followed by the absorption of toxins into the lymphatics and blood stream. There is no striking tendency to systemic infection in diphtheria, but it may occur in rare cases. The marked peculiarity of this disease is the specific toxemia which is the usual cause of death, directly or indirectly, in the fatal cases. In the rapidly fatal cases this toxemia is, in a measure, analogous to the virus of a snake bite—the system is completely overwhelmed with the specific poison. In more prolonged, but none the less fatal cases, the toxemia causes degenerative changes in important organs, chiefly the heart, which in turn results in death. A third cause of death in diphtheria is paralysis of function of the pneumogastric nerve as a direct result of the specific toxemia. In the virulence of its systemic poison, diphtheria is far and away more fatal than either of the other two common exanthematal diseases in untreated cases.

The specific germ of scarlet fever is unknown, and a definite toxemia has never been established. The most striking characteristic of this disease is the lack of immunity against streptococcus infection. All manner of infections, both local and systemic, are common. General infection, such as septic endocarditis, septicemia, septic phlebitis, etc., are more or less common in severe scarlet fever attacks, and local infections of the ear, nose, throat, muscles, etc., are well known to physicians having experience with this disease. It is assumed by the majority of observers that there is a specific scarlatinal bacteremia present during the active stage of the disease. The cause of death in scarlet fever differs in different individuals. Like diphtheria, it may occur from an overwhelming toxemia. This is not as common, however, as death from nephritis or from various forms of septicemia. The organ most susceptible to the specific influence of the disease is the kidney. Two theories are advanced as the cause of this. One is that the disease has a specific toxic effect upon the organ. The other, that there is a local infection of streptococcus origin. Almost any organ of the body may become infected in scarlet fever, but the kidney, heart, serous cavities and joints are the usual serious or fatal complications. The lack of immunity to streptococcus infection does not cease with the active symptoms of the disease, but extends well into the period of convalescence. Nothing proves this statement more than the con-

siderable number of cases of aural infection which occur during the convalescent stage of the disease. It is not unusual to have either acute otitis media or mastoiditis arise during the convalescent period. I know of one case which developed one hundred days after the active scarlet fever phenomena had passed. This phase is well illustrated by two interesting but rather extreme cases which occurred in connection with the Somerville Hospital during the past year.

The first instance was that of a child three years of age, who was in the hospital for more than six weeks with scarlet fever. All evidence of the disease except a discharging ear had disappeared, and she was about to be discharged when suddenly the mastoid became tender and edematous.

The other case was that of a child seven years of age, who developed an acute mastoiditis six days after being discharged from the hospital.

Complications in vital organs of the body in measles and diphtheria are not of especial importance to otologists, for the reason they rarely occur in conjunction with disease of the middle ear in the clinical cases. The writer found them present together in a large number of autopsy records, but his experience with clinical cases has proven them to be seldom recognized during the life of the patient. Moreover, because of the peculiar characteristics of the two infections, it is doubtful if diseased conditions of the middle ear or mastoid have any special bearing upon other distant organs. The one exception might be that of pneumonia and otitis media or mastoiditis occurring together in measles. But even in this combination, each disease may be purely local in its origin with no connection of importance between the two. Both are mucous membrane structures, and as such are especially liable to attack in measles. In scarlet fever, complications in any of the vital organs of the body may be vastly increased if diseased conditions of the ear become an added focus of infection to the toxemia already present. As a proof of this statement, cases 3, 4 and 5 are offered as evidence of the powerful influence exerted by the ear and mastoid upon such complications as those in the kidney, heart, joints, etc.

Systemic infections of middle ear origin, exhibited by a rise of temperature in every-day practice, are too well known for further discussion. In the three contagious diseases they are

the second most common complication to arise, but are not important in the mild cases except in so far as the function of the hearing apparatus is endangered. In severe cases, particularly in scarlet fever, when they occur in conjunction with complications in other organs, aural diseases assume a rôle of importance which is not commonly recognized. Lest he be misunderstood in the matter, the writer wishes to state that he does not claim middle ear disease to be a primary source of infection in the heart, lung, joints, kidney, etc., but that when it occurs in conjunction with other organic complications, the influence of acute otitis media or mastoiditis is very great. We know that scarlet fever inhibits the resistance to streptococcus infection. If then the middle ear or mastoid become an added focus of infection to an already prostrated patient, the result must of necessity be a further increase of bacterial invasion. For example: In the event of inflammation in the heart or kidney, should the middle ear or mastoid give rise to the absorption of fresh toxins into the circulation, the already inflamed heart or kidney is still further called upon for increased activity. If the original infection was all the organ could withstand and continue to functionate properly, the secondary infection from the ear may be sufficient to completely overwhelm it and cause death to ensue as a direct result of the added toxemia from the ear. As an illustration of this point the following case is offered:

A young child, five years of age, was admitted to the Somerville Hospital, May 17, 1914. The following day the right ear ruptured spontaneously. Three days later she was taken with vomiting, and a large trace of albumin was found in the urine. Shortly after the ear trouble developed there was swelling and redness of the joints of the ankles and wrists. The child continued to be very ill, with no special aural symptoms other than a profuse discharge for seventeen days, when slight tenderness developed over the right mastoid. Two days later the mastoid became edematous. The case was reported to me about noon, and I engaged to operate at five o'clock in the afternoon. At three o'clock the child died. Both Dr. Morse and the writer firmly believe this little patient could have been saved had she been operated upon a few days earlier. To strengthen the value of our opinion in this particular case, we offer the following example, which occurred in the same institution sixteen days later:

E. B., aged five years, admitted to the hospital May 12th with scarlet fever. Shortly after admission the urine showed a large trace of albumin. Eighteen days later the right ear spontaneously ruptured. It continued to discharge for sixteen days, when there was marked pain and tenderness over the right mastoid. The mastoid was at once opened and found to be filled with pus. There was a fistula through the cortex and free pus beneath the periosteum. For two days the urine remained practically unchanged, neither increased nor decreased. It then gradually improved in character, and in six days became normal. Within a few days after the operation the patient showed marked improvement, and recovered in due season without further complications of any kind.

The second child was in every way as sick as the first, except for the joint inflammation. Thus, we feel that the death of the first patient, though primarily due to scarlet fever, was very much influenced by the mastoiditis present and unoperated upon. Had we recognized the severity of the aural complication, the result might have been as favorable as the second. In a similar situation we would not wait for the tenderness or edema to develop.

The marked influence paracentesis or spontaneous rupture of a drum membrane occasionally has upon the general condition of a seriously sick patient is often remarkable. In a number of clinical records in my possession, marked improvement occurred when pus was evacuated from the middle ear. The beneficial effect, moreover, was by no means limited to a decline in temperature, but was followed by distinct improvement in untoward symptoms in the heart, lung, kidney, joints, etc. In more than one record this phenomenon occurred, not once, but several times before the death of the patient. At autopsy, not only was the middle ear found to be filled with pus, but the mastoid as well. Is this not fairly conclusive evidence that otitis media and mastoiditis occasionally exert a far reaching influence upon other diseased organs? To further illustrate, may be cited a somewhat different case in the Brookline Contagious Hospital several years ago.

A strong, robust young boy, three years of age, was admitted to this institution with scarlet fever. During the acute stage of the disease nothing of special interest occurred. When the convalescent period should have been established,

the child began to exhibit evidence of systemic infection. The glands in the neck became enlarged, temperature was elevated and the pulse became rapid and irregular. Later, the temperature became still higher and the right drum was found to be bulging. Paracentesis evacuated pus. At once the temperature fell to normal, the pulse lowered and the inflamed cervical glands subsided. A week or more later the glands again became swollen, the temperature gradually rose to 103.6°, and on this occasion several joints became reddened and painful. Again the right drum was found to be bulging and was incised, and all symptoms promptly subsided with the drainage of pus from the middle ear. A profuse discharge was maintained from the ear, but after several days the glands, joints, pulse, temperature, etc., became active again in an irregular manner. Finally, in spite of my endeavors to prevent it, the right mastoid showed typical symptoms of being involved. That cavity was then opened and found to be filled with pus. Several days previous to the mastoid operation the kidneys became sufficiently involved to give considerable anxiety to the physicians in charge of the case. Within twenty-four hours after the mastoid was opened the kidneys resumed their function, and from then on no complications of any kind occurred.

The contagious diseases have a natural period of incubation, reaction and convalescence. When one or more of these periods pass, either the patient has ceased to live, some organ becomes impaired and ceases to functionate properly, or convalescence becomes established and in due course of time the patient is restored to a normal state of health. During the active period of the disease, a certain amount of cell tissue is destroyed. The greater the prostration, the more cell tissue will be lost. If the system is not strongly overcome, the recovery will be rapid; if the prostration is great, reaction is prolonged. In a certain few cases the natural process of the disease develops to the period of convalescence, then week after week passes without the natural improvement. The vital organs functionate properly, temperature is normal, the surroundings and treatment of the case are of the most approved fashion; yet the progress of the patient remains at a standstill. In selected cases the one and only abnormal symptom present is a chronic aural discharge. As an illus-

tration of an aural complication being the sole cause of a protracted convalescence, the following case is offered:

A young boy was admitted to the Somerville Contagious Hospital with scarlet fever. He was very septic from the first, having previously had a low degree of vitality. Early in the case he developed an infected ear which continued to discharge. The convalescence was very slow, but except for a marked devitalized condition, there was no focus of infection other than the middle ear. After eight weeks, Dr. Frank L. Morse, physician in chief of the institution, called the writer in consultation. We decided the ear was the cause of the protracted convalescence, and opened the mastoid solely for the purpose of establishing better drainage from the middle ear. To our surprise, we found the mastoid filled with pus. Immediately after operation the child's physical condition improved wonderfully and his recovery was rapid. This was the first case in which we operated upon the mastoid without active symptoms present in that organ, and from this patient we learned the valuable lesson that the interior of the mastoid cavity may be filled with pus without the symptoms ordinarily attributed to that disease being present.

In hospital practice at least, diagnosis is most often made in middle ear disease by the spontaneous rupture of the drum membrane. Next in frequency are the cases showing a sudden elevation of temperature, with or without earache. Sudden rises of temperature which can be explained in no other manner than due to the ear and in which the drum membrane is neither markedly normal or abnormal, cast upon that organ a burden of responsibility not easily disposed of. Dr. George A. Leland years ago described three distinct types of drum membrane which are indicative of acute otitis media, and his description cannot be improved upon.

The writer is especially interested in the condition of the mastoid in the severe cases of the contagious diseases. He knows from a study of a large number of autopsy records that both acute and chronic mastoiditis are present in many unsuspected cases. Both acute and chronic forms of the disease may remain unsuspected for a considerable length of time. The symptom of edema over the mastoid or of protrusion of the auricle are late symptoms, and usually occur after the cortex has perforated. Temperature amounts to absolutely

nothing as a diagnostic point, and tenderness over the mastoid is of value only when present. Its absence means nothing.

In a severe case of scarlet fever in which the septic influence of the disease is manifested in such a complication as septicemia or acute nephritis, if one or both middle ears become infected, the mastoid may also be suspected of being involved. In the early stages, symptoms of an acute nature will be limited to the middle ear, and the classical symptoms of mastoiditis (pain on pressure, edema, protrusion of the auricle, etc.) will not appear until later. If, however, the mastoid is opened in the early stages, its cavity will often be filled with pus. If, in the event of serious complications in vital organs, paracentesis causes marked temporary relief, but later the symptoms return and remain active until another paracentesis is performed, then the mastoid may be considered to be infected and should be opened at once. The necessity for repeated paracenteses is in itself a strong indication for the mastoid operation. If cold applications to the mastoid region cause a drop in temperature, or a marked relief of symptoms in other parts of the body, such as the kidney, joints, etc., the improvement gained thereby is to be viewed with extreme suspicion. The application of cold will often temporarily decrease bacterial absorption from ear or mastoid, but only at the expense of valuable time. The writer firmly believes the use of an icebag is absolutely contraindicated when aural complications occur in serious cases of the exanthemata. The predominating toxins and predisposing agents in this class of cases are so powerful and virulent as to make the application of cold entirely inadequate to cope with the situation. It may, however, mask important symptoms sufficiently long to make their use a positive menace to the patient's life. Frequent paracenteses are also weak reeds to lean upon, as even the desired drainage from the middle ear is not sufficient to overcome suppurative mastoiditis when present. This is particularly true if a temporary improvement follows each incision. The following cases illustrate examples of mastoiditis being present without the usual symptoms:

E. P., three years of age, a pitiful specimen of humanity, feeble minded and blind, developed otitis media twenty-one days after admission to the hospital. Both ears continued to discharge copious amounts of thick pus. Four weeks later,

without further symptoms, both mastoids were opened. One was practically normal, the other was found to be almost eaten away. The lateral sinus was exposed three-fourths of an inch and was bathed in pus and covered with granulations. After operation the child's general condition improved wonderfully, and in due time both middle ears became dry.

M. L., a girl of eleven years, was admitted to the same institution with scarlet fever. She developed an acute ear nine days later. When examined by the writer, twenty-one days afterward, there was a profuse discharge from the right ear. Inspection showed a perforation in the lower margin. The drum was red and slightly bulging. There was no temperature or untoward symptom in the case other than prolonged convalescence and the chronic discharge. The mastoid was opened and found to be entirely sclerotic, requiring the constant use of mallet and chisel. On nearing the antrum the chisel suddenly slipped into an opening which proved to be an abnormally large antrum. A probe introduced into this cavity found the entire roof of the antrum, aditus and middle ear to be wanting. The dura was exposed, covered with granulations and bathed in pus. Possibly this patient was a candidate later for a brain abscess or meningitis with the ordinary treatment of the middle ear. Such dire consequences cannot be predicted for her, however, as both brain abscess and meningitis are rare in the contagious diseases even with unrecognized mastoiditis. In fifty-nine such unrecognized cases, brain abscess did not occur at all, and meningitis was present in but one instance, though a fistulous tract was found leading from the middle ear to the cranial cavity in four. After operation the last case showed the same improvement in rapid convalescence as did the first, and the middle ear became dry in a short time.

The importance of radical surgical procedures when middle ear disease occurs in conjunction with serious complications in other vital organs cannot be overestimated. The extreme necessity of ridding the system of added bacterial invasion before the patient is overwhelmed is great. For the severe septicemia such as occurs in scarlet fever from the toxemia of the disease itself, we have few remedies at hand. Specific antitoxins cannot be obtained in scarlet fever and measles. Antistreptococcus serums are ideal in theory, but

they have utterly failed in their mission. Local infections with the formation and absorption of toxins in the glands, tonsils, etc., are often opened with splendid results. The middle ear and mastoid belong to the local infection group, and can be as easily and quickly eliminated if diagnosed sufficiently early.

Fear of anesthetics or of surgical shock is not as grave a question as it would appear. On first thought, it would seem exceedingly rash to administer an anesthetic or to operate upon a patient who was profoundly septic or greatly weakened from overexertion of the vital organs. To give an anesthetic to a patient with pneumonia or acute nephritis would seem, on the face of it, extremely foolhardy. The writer has given ether and operated upon one or both mastoids with each of the above complications present, and has never known harm to result or the complication to be increased in severity. Several of the patients were desperately ill, but in each and every case the desired result was quickly forthcoming. In each instance the operation proved that draining the infected mastoid cavity did far more good than ether or surgical shock did harm. Thus far the writer has never had a death from this class of a case, though he has had considerable difficulty at times in obtaining permission to operate upon such apparently poor surgical risks.

In every instance, ether alone was used as the anesthetic. One case had double mastoiditis, more or less general septicemia, pneumonia, and almost complete suppression of the function of the kidneys. The effect of the operation was most pleasing, as all the complications soon subsided and the patient recovered without further complications of any kind.

I have operated upon at least half a dozen cases having acute nephritis well advanced. In no case has the ether appeared to have affected the kidneys unpleasantly. In the event of pneumonia as a complication, chloroform alone, or mixed with ether, might be substituted for pure ether in the hands of an expert anesthetist. Personally, the writer is much more afraid of the choloroform than he is of the complication. Surgical shock has never entered into the situation in any of my cases.

There seems to be a difference of opinion in regard to the virulence of infection in aural discharges. Dr. Place, of the

Boston City Hospital, states that nasal secretions are the most virulent. Dr. Morse, of the Somerville Hospital, gives preference to the ear in this respect. One striking case of an aural discharge spreading infection occurred in a case operated upon for mastoiditis in the Somerville Hospital. The wound healed all but a tiny scab. Because of lack of room in the institution, the child was discharged to make room for others. The mother neglected to comply with instructions regarding the necessary cleanliness, and the child promptly infected one brother and two sisters with a virulent type of scarlet fever. The two sisters died of the disease. A case recently released from the Boston City Hospital developed a nasal discharge after leaving the institution, and infected four other cases with scarlet fever.

Both aurists and general practitioners of medicine may study aural complications more carefully, with profit to themselves and their patients. Only a comparatively few general practitioners understand the significance and dangers of such complications. The average physician at large recognizes an aural complication only when a profuse discharge from the ear refuses to be concealed any longer. The particular lesson for the average specialist to learn is not to wait for the last possible symptom of mastoiditis, jugular thrombosis or meningitis to develop before taking active operative measures for the relief of urgent symptoms. The extent to which this practice is followed by men whose wide experience should have taught them better judgment in the matter, is astonishing. The excuse given is the patient is too ill to be operated upon. The sufferer is therefore allowed to die and the one real opportunity to save his life is lost.

II.

AN ACHING THROAT.*

By G. Hudson Makuen, M. D.,

Phi' adelphia.

The specialist nowadays is confronted with so many serious problems, or problems involving the question of life or death, that he is apt to overlook those of a seemingly less serious nature and oftentimes to neglect them entirely. The affection which I am about to describe is one that is not dangerous to the life of the individual, but it is exceedingly annoying and detracts greatly from the pleasure of living.

An aching throat, like an aching ear or an aching tooth, is a condition sufficiently common and sufficiently important to call for careful consideration. The affection occurs for the most part in those who are nervously and physically below par, and it may be the result of one or many etiologic factors. Dr. W. H. Kelson, an Engl' h physician, says that it is frequently associated with const ation and flatulent dyspepsia, and that it may be due directly to toxic infection, or it may be a referred pain, such as that which occurs in diseases of the larynx and upper part of the esophagus. He furthermore states that alcohol seems to be a factor in the causation of the affection in many instances, and that it aggravates the trouble in all cases.

The local conditions which accentuate, if they do not actually cause, the affection are found in the pharynx, nose, accessory sinuses, and teeth. It is well-known that earache, with which an aching throat is comparable and frequently associated, may be the result of similar etiologic factors, the particular one or more of which being determined oftentimes with great difficulty and usually by the process of exclusion.

*Read before the joint meeting of the Southern and Eastern Sections of the American Laryngological, Rhinological and Otological Society, January 9, 1915.

It has been my fortune to see two cases in which a severe aching throat was the chief cause of complaint, and the affection continued intermittently in both of them for a period of several years.

The first case was that of a man, forty years of age, who complained of having had throat and voice trouble for years. He was a member of the bar and did a considerable amount of public speaking. His pharynx was highly congested, the faucial and lingual tonsils were slightly enlarged, and he had had several attacks of tonsillitis. He also had flatulent dyspepsia and more or less constipation, but no rheumatism or gout. He was not addicted to excesses of any kind, and he indulged in neither alcoholic stimulants nor tobacco. He had a catarrhal condition in the nasopharynx which was accompanied at one time by an offensive unilateral discharge suggesting sinus disease, but this cleared up and the transillumination test was negative. The patient's chief complaint at the time of consultation was pain in the left side of the throat, and he thought he could locate its origin in certain congested lymphoid follicles in the lower part of the pharynx.

Portions of a small but degenerated faucial tonsil on the left side were removed, as well as portions of the lingual tonsil, and the various pockets formed by inflammatory adhesions were opened up with the angular knife and cautery. Relief always came or seemed to come after these operations, and especially after the use of the cautery in one or more of the diseased follicles to which I have referred, and he persisted in the treatment for many months, locating for me the point or points in the pharynx in which the pain seemed to originate and from which he said it radiated upward toward the region of the ear. We finally succeeded in removing or destroying these points of irritation and possible infection, and the trouble for the most part cleared up in a satisfactory manner, and the voice correspondingly improved.

In the second case we were not so successful. The patient was a maiden lady, about thirty years of age and in fairly good general health, having but little digestive trouble and no rheumatism or gout. The aching seemed to begin in the left tonsil, and from this point it occasionally extended to the mastoid and sometimes to the frontal region. There was a slight nasopharyngeal catarrh, and the faucial tonsils were

enlarged and degenerated. The upper teeth were in good condition, but the two lower posterior molars on the left side had large cavities which had been filled, one with amalgam and the other with gold. During the time of treatment, however, the teeth seemed to be giving no trouble whatsoever, and we thought that they could be eliminated as possible causal factors. The various nasal accessory sinuses were also examined and the transillumination tests were made, but no disease of any kind was found in these regions.

I suggested a removal of the faucial tonsils in an effort to relieve both the nasopharyngeal catarrh and the aching throat. This was done under general anesthesia, and the operation was altogether satisfactory, there being no cicatricial contractions or adhesions whatsoever. In fact, if I had not done the operation myself, I should say that it was one of the cleanest and best results I have ever seen. The catarrhal condition cleared up satisfactorily, and the hearing, which, by the way, was slightly impaired, also improved, but the aching throat continued and, if anything, increased both in intensity and in the frequency of the attacks.

The patient was under observation for several months, and therefore I was able to make a careful study of the condition. The aching throat, as I have said, not only continued, but became considerably aggravated immediately after the removal of the tonsils, although the healing of the wound was uneventful and finally complete.

The diet of the patient was carefully regulated and the hygienic conditions of her home environment carefully looked after, but all our treatment failed to give complete satisfaction and only slightly alleviated the discomfort and sometimes the actual pain which the patient suffered.

I have reported these two cases at some length, because they seem to me to present problems of considerable interest. The affection is not a common one, and its etiology is still in doubt. My own experience with it leads me to think that there probably are many causal factors, and that they act conjointly in giving rise to the condition.

III.

BACTERIAL VACCINE THERAPY IN DISEASES OF THE EAR.*

By Wilfrid Haughey, A. M., M. D.,

Battle Creek.

The theory of vaccine therapy is sufficiently appreciated to obviate the necessity of repeating at this time. A few general principles may be stated, but chiefly I shall confine myself to an inquiry as to its value in diseases of the ear.

The use of stock vaccines reflects no particular credit, a careful bacteriologic diagnosis usually not being considered necessary. The general symptoms and characteristics of the suppurative or inflammatory process are considered, and a guess often made as to the causative germ.

A mixed vaccine is then given in the hope of striking the nail with one of the constituents of the vaccine. Frequently no benefit is seen, and the method is discredited.

The opsonic index and socalled negative phase are not now dreaded to the extent of a few years ago. We do not use them much, watching rather the general condition of the patient and the diseased process, being thus guided in repeating our dose.

Autogenous vaccines should be carefully made, extreme care being taken in making the culture to have all secretions wiped out of the canal and the canal disinfected with alcohol. The pneumatic otoscope is used to draw out any secretions which cannot be reached by a sterile platinum loop in the tympanum or attic. When the culture is secured in this way, we are reasonably certain to secure the responsible active organism. Too great heating of the vaccine in killing the germs may very easily lead to inactive vaccine, and no result in treatment.

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*Read before the Southwestern Michigan Triological Society, at Battle Creek, Michigan, December 7, 1914.

In my cases I have used dry cleansing and other routine methods of treatment, together with attention to the nose, for at least a week without result before using the vaccine. I have kept up the local treatment in conjunction with the vaccine.

Acute suppurative otitis media generally responds promptly to ordinary cleansing treatment. In these cases I have not used vaccines. I have first satisfied myself that the condition is subacute or chronic. Wright, Pearce, Dabney, and others, however, advise the use of autogenous vaccines in all cases where it is at all possible to get them, on the ground that the condition will clear more promptly and more completely, recurrence being more rare.

Dabney (*N. Y. Med. Jour.* for 1912) mentioned that there is an improved general condition in many of these patients following the use of vaccines, and I have found a similar result.

Case 1.—H. R. F., man, twenty-four years old. Right ear and auditory canal very tender, upper posterior wall of canal sags and extremely tender. Mastoid region tender. Paresthesia over distribution of facial nerve. Throat has been sore for a week. Micrococcus capsulatus mucosus found in throat and also after paracentesis. Temperature 103°. Diagnosis, acute mastoiditis. Operation declined. Stock vaccines used, and after three injections at intervals of three and four days respectively, beginning with one hundred million and doubling at each injection, the condition entirely cleared. Patient now in French war zone with Canadian army.

Case 2.—F. J. C., man, thirty-five years old. Double paracentesis for double otitis media. Ears discharged freely, a mixed infection with staphylococcus pyogenes predominating. This man was a commercial traveler and very anxious to proceed on his way. The discharge persisted, so I used a commercial mixed vaccine of two hundred million each of staphylococcus pyogenes albus and aureus, two injections, after which the discharge promptly cleared and the drums healed.

Case 3.—J. L. W., woman, twenty-two years old. Right ear deaf a year or more, left also becoming deaf. Both ears discharging foul pus from marginal ulcers on posterior quadrants of drums. Treated two weeks, then began using

stock vaccine, mixed staphyloccocus pyogenes aureus and albus, the infection being of staphylococcus nature. Six injections were given at intervals of four to seven days, with complete drying of discharge and improvement of hearing. The perforation of the right drum was large and closed only under a paper patch. This drum developed another perforation six months later with discharge of nasal mucus following "cold in the head," but promptly cleared under suitable treatment.

Case 4.—E. McC., boy, six years old. Scarlet fever three years previous. Both ears discharged for a long time. Right ear still discharging a foul sticky grayish pus through a large anteroinferior perforation. This ear cleared in about eight weeks with treatment once a week—patient living outside of town. The condition recurred at the end of four months. At this time stock vaccines were used consisting of staphylococcus pyogenes aureus and albus, Friedlander bacillus and a streptococcus, to correspond as near as we could to the mixed infection present. Ten injections at one week intervals failed to clear the condition, the weekly treatment and cleansing being probably too infrequent, but I could not prevail upon the parents to let me see the boy oftener. Autogenous vaccines were then substituted for the stock, and after seven treatments at week intervals, and one four weeks later, the ear entirely cleared up and has remained so more than a year.

Case 5.—H. M., boy, one year old. Had been treated elsewhere two weeks for discharging ear. I was unable to clear it in ten days, so used a vaccine which had been prepared for another case, and after two injections at four day intervals secured complete healing with drying of discharge and closure of perforation. This was a staphylococcus infection and vaccine.

Case 6.—H. S., girl, fourteen years old. Left ear has discharged since she was a small child. Right ear discharged for long time, but not now. Discharge from left ear scant, but very foul. Examination showed a mass of débris filling the whole canal and hard as bone. It took me several days to clean this out because of the pain and refusal of anesthetic. I had to cut the mass into pieces. Family had been told by an aurist that there was no canal. The superficial layer had been disintegrating and discharging. Under the mass the

drum and parts of the ossicles were gone. Some cotton was found in the deeper parts, and a very foul discharge, staphylococcic, which did not respond promptly. I administered four injections of autogenous vaccine at four, eleven and seventeen day intervals, this being the best I could do on account of patient living in another town. The discharge almost stopped under the first two treatments and was entirely clear at the last, but the injections were given on general principles. A year and a half has passed with no recurrence.

Case 7.—E. M., girl, two and one-half years old; weight, seventeen and one-half pounds. Mother died of tuberculosis when child was one year old. Left ear had a profuse and very foul discharge of several months' standing. Did not clear in two weeks' treatment. Autogenous vaccine then prepared and two doses of twenty million given six days apart. There was prompt healing, and the perforation had closed in another week. I failed to learn the variety of the germs found in culture, the laboratory sending me the vaccine without bacteriologic report.

Seven months later this child was brought to me with the other ear in a condition similar to the first. This cleared after seven routine treatments, but recurred three months later, at which time I gave two doses of the vaccine prepared for the first ear, five days apart, with marked improvement. The child objected so strenuously that we discontinued the vaccine and continued the other treatment with complete recovery after six weeks of desultory treatment. This child stayed normal six months, when she died of pneumonia, according to newspaper report.

Case 8.—H. B., girl, three and one-half years old. Had earache and convulsions. Acute otitis media. Paracentesis performed and a very profuse discharge secured of a short chained streptococcus with a small spirocheta. I treated this carefully every day for three weeks, with no marked improvement. Then administered autogenous vaccine March 20th and 24th, 1913. The discharges stopped and patient did not return until May 22d, when there was a slight recurrence, but this promptly cleared with one injection of the vaccine. There has been no recurrence.

Case 9.—I. K., girl, two years old. Has had a fever around 103° for three weeks with swelling back of ears. Ears broke

and began to discharge through canal, then fever came down to 101° and case referred to me. Ears treated every day for a week, but mastoid still tender and ears still discharging with temperature normal. Autogenous vaccine prepared and four injections given at five day intervals with complete recovery. Over a year and a half has passed and no recurrence has been reported to me.

Case 10.—R. N., boy, four years old. Acute otitis media with spontaneous rupture. Mastoid tender, but I believe only hyperemic. After two weeks' treatment ear was still discharging profusely, but mastoid tenderness had gone. Autogenous vaccine (combined staphylococci and streptococci) given at four and five day intervals for three injections, when the ear was completely cured.

Case 11.—F. W., man, thirty-three years old. Ear had been discharging for three days. This was a recurrent condition and had been present for several years, discharge gradually clearing up each time after several weeks' treatment. I found a very large perforation in the lower part of the right drum, and a profuse discharge full of streptococci, staphylococci, a few small spirochetæ and detritus. Hearing reduced one-half. Immediately had an autogenous vaccine prepared and gave one hundred million; dose repeated after three days with two hundred and fifty million, then repeated with intervals of seven, four, five and four days. The ear became perfectly dry and remained so for three weeks, when there was a recurrence that cleared up with one injection of vaccine. A paper patch was placed over perforation, which stayed on three months and left the hole closed. At the end of another six months, during a severe "cold in the head," a blast was blown through this drum, and for a few days discharge of nasal mucus persisted, until I succeeded in convincing the patient that a cure depended wholly upon himself. The discharge promptly stopped with proper nasal hygiene, and another paper was placed on the perforation. Two months later the paper was still in place. Six months more have passed and no recurrence of trouble. Hearing is now normal, and patient reports that paper patch came out four weeks ago. Drum healed.

Case 12.—J. W., woman, twenty-two years old. Mastoid operation several years ago. Had earache with ringing and

throbbing for three days. Posterosuperior canal wall sagging, whole mastoid region tender. Paracentesis secured profuse discharge which did not respond in a week's treatment, whereupon a fifty million dose of autogenous vaccine was administered, followed four days later with one hundred million, and then three doses at four day intervals of two hundred million. The discharge from the auditory canal ceased and drum healed, but a tender spot still remained in the scar of the old operative field. This was incised and healed in three or four days. I heard that about a year and a half later she had a recurrence treated elsewhere, so cannot report as to the nature of the recurrence. After the administration of the vaccine under my care, her general health improved as well as her ear.

Case 13.—J. G. C., woman, age thirty-six years. All mucous membranes congested; sinuses painful; left mastoid very tender. Left ear discharging. This condition cleared up under general and local treatment in two weeks, but recurred three months later. The left ethmoidal region showed acute infection; middle ear and mastoid tender, but no discharge. Culture made from ethmoidal discharge showed a mixed streptococcus and staphylococcus infection. Autogenous vaccines were prepared and eleven injections of one hundred million dose given at intervals varying from three to six days. The condition cleared entirely and has not returned for twenty months. Two of these injections were made after all soreness and inflammation were apparently gone.

Case 14.—L. P., boy, age seven years. Had been sick with mixed infection of scarlet fever and diphtheria for five weeks. Ears discharging and bulging for nearly two weeks when I saw him. Discharge from both ears profuse and foul. Patient had a septic temperature, emaciated and unconscious. Doctor in attendance thought he was dying. Double mastoid operation. Subperiosteal abscess on left side contained nearly an ounce of pus. Found much necrosed bone and granulation tissue all through mastoid cortex. Antrum and attic filled with granulations of a foul nature. Open dressing. Right side presented no pus until cortex was opened. Pus profuse and extremely foul; bone necrosed and curetted easily, leaving a great cavity. Attic and antrum full of foul granulations. Cleaned as best we could without disturbing

ossicles. Boy doing very poorly under anesthetic and operation necessarily hastened. Open dressing, no suture on either side. Time of operation from beginning of anesthetic (chloroform) until completion of dressing and boy returned to bed, one hour and ten minutes. The discharge on the dressing was very profuse and foul. Autogenous vaccines prepared and administered after five days. Seven injections at intervals of three to six days were given. Posterior wounds healed slowly, but boy soon picked up in general health, then healing was much more rapid. Discharge almost stopped, there remaining only a stringy mucus. After a couple of months I again gave four doses of autogenous vaccine in an endeavor to clear this condition, but without success. At the expiration of eighteen months after operation he still has the stringy sticky discharge in very small amount, but is a strong, robust boy. I feel that the vaccines in this case were not a complete success, although great general improvement undoubtedly ensued. I believe there is no necrosed bone left in the ears and contemplate another course of autogenous vaccines.

Case 15.—J. T., girl, age fourteen years. Has had discharging ears with great deafness since she was five years old. Discharge profuse and very foul; so much so that her schoolmates shunned her. Hearing 25/90 each ear by air conduction. Bone conduction increased, 65/45. This child has had several courses of treatment by douches, powders, etc., extending over long periods of time. By dry cleansing and use of glycerophenol 1/12 I succeeded a couple of times in drying up discharge, only to have it recur. Autogenous vaccines were then made, but eight injections at varying intervals made no impression. Cleansing daily with alcohol, glycerophenol, tannic acid, boric alcohol, hydrogen peroxid, boric acid and calomel powder, formalin, etc., for six months made no impression. Operation was decided upon—double meatomastoid. The cortex was eburnated—all cells filled up and solid as ivory until the antrum was reached, which with the attic and tympanum was full of foul granulations. These were cleaned out as well as possible without removal of ossicles; opening made into posterior wall of meatus and posterior wounds closed by first intention. Discharge is now scant, and I contemplate another course of

autogenous vaccines. Hearing 75/90 by air conduction. General health much improved immediately following use of vaccines. Odor of discharge has been slight since vaccines were first used.

Case 16.—J. R., girl, age seven years. Had had discharging ear for several weeks. Did not heal with ten days' treatment. Autogenous vaccines given at intervals of four to seven days. Five injections resulted in complete cure and no return for twenty months.

SUMMARY.

I have reported six cases which I shall call subacute otitis media purulenta. Some were of comparatively short duration before vaccine treatment, but all had been thoroughly treated for from one to three weeks before use of vaccines. Other treatment was not suspended. One case was treated with stock vaccine, one with a vaccine autogenous for case 9 listed in this group, and four were with autogenous vaccines. All six cured.

There are six cases of chronic otitis media purulenta reported. One was treated with stock vaccine, three with autogenous vaccines, and one at first with stock vaccine unsuccessfully, later successfully with autogenous vaccines. In the table this case appears twice, once as a failure under stock vaccine and once as a cure under autogenous. The sixth case was the double meatomastoid case; autogenous vaccines made only slight improvement so far as the ear was concerned, not at all clearing the discharge.

There are also four cases classed as mastoiditis. One a simple acute micrococcus mucosus infection, cleared under stock vaccines. The second, a recurrence in an old mastoid wound, cleared under autogenous vaccines. The third, acute mastoiditis, was cured with autogenous vaccines. The fourth, postscarlatinal and postoperative, improved, but dischage still present in small amount.

While my experience has not been very extended, it has been confirmatory of the findings of others over a number of years, and indicates that, especially in slowly healing cases, we should give our patients the benefit of this branch of therapeutics.

The study of the accompanying table, from Dabney, *Laryngoscope*, Nov., 1914, to which these cases are added, shows that in the treatment of subacute purulent otitis media if we deduct the nine and one-half per cent of cases which were lost sight of before treatment was completed, there were seventy-eight per cent of cures, thirteen per cent of improved and nine per cent showing no improvement.

In chronic purulent otitis media the percentages are: cured

Author.	Disease.	Number	Cured	Improved	No change
McDonald	Subacute O. M. P.	13	13		
	Chronic O. M. P.	17	3	5	9
Weston & Kolmer	Subacute O. M. P.	100	83	10	7
Patterson et al.	Subacute O. M. P.	10	7	0	3
	Chronic O. M. P.	17	3	3	11
Conners	Subacute O. M. P.	7	2	3	2
Christie	Subacute O. M. P.	6	6		
Jacobs	Chronic O. M. P.	6	2	4	
Thomas	Chronic O. M. P.	1	0	0	1
Hoobler	Chronic O. M. P.	2	2		
	Mastoiditis	1	1		
Beck	Chronic O. M. P.	7	0	7	
Scott	Mastoiditis	1	1		
Hill	Subacute O. M. P.	124*	70	22	5
Dabney	Furunculosis	36	36		
	Chronic O. M. P.	22**	7	5	10
	Subacute O. M. P.	23	18	0	5
	Mastoid sinus	15**	9	4	2
Haughey	Subacute O. M. P.	6	6		
	Chronic O. M. P.	7	5		2
	Mastoiditis	4	3	1	

*Three operated for mastoiditis: twenty-three disappeared.
**Two diabetics.

twenty-eight per cent, improved thirty per cent, and not improved forty-two per cent.

In mastoiditis there are sixty-seven per cent of cures, twenty-four per cent of improvements and nine per cent of failures.

In subacute otitis media and in mastoiditis (acute) the cures and improvements together amount to ninety-one per cent each—a very decidedly favorable report. Of course, the

question promptly arises, Would not many of these have improved without vaccines? The only answer we can give is that in most, at least of those here studied, they had not responded under one to three weeks of treatment without vaccines. Even if one-half be deducted to take care of all the cases which might have so improved, the balance is still too good a showing to warrant discarding this method.

In chronic otitis fifty-nine per cent show cure or improvement, a considerable number, considering the handicap, and too good a showing also to warrant neglect of this aid in our armamentarium.

IV.

MENINGITIC SUPPURATIVE EXTRADURAL ABSCESS OF THE POSTERIOR FOSSA OF THE SKULL AFTER PURULENT TONSILLITIS.

By Dr. Oscar Beck,

Vienna.

There is a comprehensive literature concerning the dangers which threaten the organism as a result of inflammation of the tonsils and the sequelæ of acute infections of the throat. This subject was well covered in the thorough review of Kuttner on the acute throat infections, presented at the Seventeenth International Congress in London. I am adding a word to the literature on this subject, because the following case of mine seems to present an almost unique example, and as far as I can discern in the records, only one parallel case is recorded.

History.—A seven-year-old child, always well, according to the statement of the father. The child had had none of the socalled diseases of childhood. After playing contentedly all day long, apparently in the best of health, on the night of April 10th the patient suddenly became ill, with high fever, great restlessness, crying out, persistent severe vomiting, headache and dizziness. The physician called to see the case could find no internal cause for the symptoms. The child showed complete paralysis of the left facial and abducens nerves, with a spontaneous nystagmus toward the right. The patient complained of diminished hearing in the left ear.

The condition did not improve during the next few days, and the child was taken to Lemberg, where a neurologic examination was made. I am not conversant with the exact details of this examination. However, the child was admitted to the Vienna Ear Clinic with a provisional diagnosis of tumor cerebri. I lay special stress on the fact that the patient's father and the child walked into the clinic. On admission, April 21, 1914, the patient had a temperature of 38.7°.

Status Presens.—Child is normally developed, understands all questions and answers correctly. The skull is generally sensitive to percussion. No neck rigidity. Spontaneous and passive movements of the head cause no pain. Severe headache and moderate dizziness are present.

Findings of the cranial nerves.—Left corneal reflex absent; left abducens paretic; left facial paretic in all three branches. All other cranial nerves reacted normally. Tendon and cerebral reflexes normal. No hypo- or hyperirritability, no differences in irritability of the two sides. No Babinski, Oppenheim or Kernig. Mouth and pharynx configuration normal. No difficulty in swallowing. Internal examination revealed a slight degree of bronchitis on the left side.

Ear Findings.—Right: Middle ear, cochlear and vestibular organs normal. Left: Middle ear catarrh, complete deafness. Spontaneous rotatory horizontal nystagmus of the first degree, toward the right. The left vestibular apparatus is unresponsive to all tests tried.

Lumbar Puncture.—Pressure not increased. Fluid clear. A small fibrin web containing few lymphocytes. No polynuclears or bacteria are precipitated by means of the centrifuge.

The clinical picture remained unaltered for the next few days. Frequent examination of the mouth and pharynx always negative. No changes noted in the nervous symptoms. On April 24th the temperature rose to 40°. On April 25th at 9:30 o'clock in the morning, the child suddenly became moribund. Pupils were narrowed, reactionless, respiration 30 per minute, Cheyne-Stokes in type, pulse 124. The upper and lower extremities were flaccid, no reflexes obtainable. Incontinence of urine and feces.

Lumbar puncture being again made, pressure was not increased. Fluid slightly cloudy, contained polynuclear leucocytes and many streptococci.

Autopsy (Dr. Erdheim).—Old purulent tonsillitis right. Fresh purulent tonsillitis left. Large retro- and subpharyngeal abscess, which extends into a large abscess cavity in the bones of the base of the skull. The bony base of the skull is completely destroyed at this point, and while the overlying dura seems to be intact, it is distinctly hyperemic and is covered with a thin fibrinous membrane over the clivus and the posterior surface of the sella turcica, pachymeningitis interna.

The hyperemia of the dura is most marked at the meatus acusticus internus. On the introduction of a probe into the cavity which results from partial destruction of the occipital, sphenoidal and petrous portion of the temporal bones, one finds that the bone defect is confined to the left side and is sufficiently large to involve the points of exit of the left trigeminus, abducens, facial and acusticus nerves. Stripping off the dura from the middle fossa of the skull on the left side, reveals the fact that the right apex of the pyramid is destroyed and that pus extends as far forward as the under surface of the Gasserian ganglion.

In the left middle ear a large amount of clear mucoid fluid was found. The right tympanic cavity shows a dry mucosa. Fresh purulent meningitis with a collection of cloudy yellow exudate almost completely confined to the base in the cisterna chiasmatis and the cerebral medulla. The leptomeningitis follows along the Sylvian fissure, and to a slight degree on to the convexity of the brain, which is completely free from purulent exudate.

Small areas of bronchopneumonia in the right lower lobe. Parenchymatous degeneration of the heart, liver and kidneys. Ascaris in the duodenum.

To sum up, this was a case characterized by the sudden appearance of symptoms referable to a lesion in the left posterior fossa of the skull, involving the trigeminus, abducens, facial, cochlear and vestibular nerves. Otherwise, neurologic examination was negative.

Such isolated affections have been described by Frankel-Hochwart. He described a basal process, in fact a polyneuritis, involving the facial and acoustic, which he calls polyneuritis cerebralis meniereformis. This symptom complex, which often develops on a rheumatic basis, must also be taken into consideration in discussing this case. One must also bear in mind that this might be that form of poliomyelitis which is characterized by a predominance of cranial nerve symptoms. Wikmann, following Medici's lead, distinguishes a bulbar or positive type of this disease, depending upon the distribution of the paralysis or the prevalence of certain symptoms. .This form corresponds fairly well to the type described by Zappert, in which there are cerebral symptoms, especially those pointing to cranial nerve involvement, seldom with cortical symp-

toms. Very often the abducens is involved with the facial. A beginning tuberculous meningitis was also considered, hence the lumbar puncture. But as the spinal fluid pressure was not increased, the fluid clear, and the cell count low in lymphocytes, the symptoms had to be considered as due to another cause. Besides, blocking of the cochlear and vestibular nerves is very rare in tuberculous meningitis.

The autopsy cleared up the clinical picture. A rather rare sequence of events followed a purulent tonsillitis, a retro- and suprapharyngeal abscess developed and, as it increased in size, pressed upward against the base of the skull, destroyed the bones in their entire thickness and involved all the parts of the floor of the left posterior fossa in a large subdural abscess. An X-ray plate which was made from the specimen shows the point at which the abscess broke into the skull, also the defects in the occipital and sphenoidal bones. Nothing pathologic could be noted in the mucosa of the mouth or pharynx, and the tonsils seemed normal, but by cutting deeply into the tonsillar tissue, a large amount of pus was brought to light, especially on the left side. Changes in the musculature of the pharynx near the tonsils were noted, the muscle tissue being slightly involved, but near the floor of the skull much more marked changes were found and much free pus encountered. That explains the absence of bulging of the pharyngeal wall at examination.

One could follow the course of the infection from the left tonsil along the roof of the pharynx so plainly at autopsy, that no doubt can exist that the whole process must be interpreted as having originated in the tonsil. Autopsy also explained why the tonsillitis and the retro- and suprapharyngeal abscess were not recognized clinically. The first symptoms began when the abscess broke through the floor of the skull and exerted pressure on the dura. The duration of the entire illness was fourteen days.

The secretory catarrh of the tympanic cavity was also explained at the necropsy. The auditory nerve was bathed in pus, and it is very probable that a labyrinthitis was induced through the internal auditory canal, and the secretory catarrh of the tympanic cavity is to be interpreted as a collateral edema.

One might interpret the findings in this case as one of pri-

mary osteomyelitis of the base of the skull, with consequent gravitation of the resulting abscess toward the tonsils. It would be difficult to say positively whether the case is one of a purulent process which sinks from the floor of the skull towards the tonsils, or one of pyogenic infection arising in the tonsils and extending upwards toward the base of the skull, but there is much to say for the latter view.

In the first place, the presence of streptococcus in the abscess, in the meninges and spinal fluid, because we usually consider osteomyelitis as a staphylococcic mycosis. Then, in the decision of just such a case, the anatomist, in view of his findings, has the decisive word. Again, after a careful perusal of the literature, I find a similar case reported by H. Neuman of Vienna.

V.

REPORT OF CASE OF DOUBLE MASTOIDITIS, WITH PURE CULTURE OF STREPTOCOCCUS CAPSULATUS MUCOSUS FROM THE MASTOID CELLS OF BOTH EARS.

By W. D. Jones, M. D.,

Dallas.

As a general rule, we are guided by the clinical symptoms as to whether or not we operate early in acute mastoiditis. However, there are exceptions. I have in mind a case in which I was called in consultation, which presented quite a contrast to the one I am reporting. In this case the symptoms were vague, with very little tenderness over the mastoid, and only three-fifths of a degree of fever in the afternoon. In the fourth week, symptoms of meningeal involvement developed, and an operation showed exposed dura over the tegmen antri. On the following day symptoms of meningitis were pronounced. A lumbar puncture was made, and a culture taken from the cerebrospinal fluid, in which a few pneumococci were found. Next day the fluid was cloudy, and culture again developed pneumococcus. Lumbar puncture and culture on the third day showed the same organism, but a marked increase in number. The patient died on the fourth day.

In the case I am reporting the patient was very ill from the beginning, all the symptoms were pronounced from the onset, and in all probability only an early operation saved this patient's life. I am convinced that the bacteriology of the infection should be a governing factor as to when to operate in those cases where the symptoms are mild but persistent.

On October 28, 1913, I was called to a nearby town to see Mrs. W. P. H. Family history, negative. Past illnesses: had diseases of childhood, and two years ago had albumin in urine, which was probably an acute condition, as examination

shows no albumin or casts at present. Present illness: night of the 24th instant, following a cold and sore throat since October 20th, patient had a severe pain in left ear. On the morning of the 25th she had a chill and some fever; pain in the ear not so severe during the day. On the night of the 25th, pain was so severe in left ear that she was unable to sleep. On the night of the 26th, she had severe pain in both ears, and was given morphin for relief. Patient had fever all next day, the 27th. I was called on the night of the 27th, and saw patient at two o'clock the morning of the 28th. On examination I found the following condition: Temperature 102° F., pulse 96 per minute, respirations 20 per minute. She had the appearance of being very sick, and her expression showed she was suffering intense pain. Tenderness was very pronounced over both mastoids, with bulging of both drum membranes. I made a free incision in both drum membranes, and ordered hot irrigations of saturated solution of boric acid every two hours, with ice to both mastoids. Patient was advised to come to the sanitarium at Dallas that day, and trained nurse was engaged to carry out the treatment. The paracentesis and irrigations seemed to give little relief, if any, and she was given opiates to control the pain. Her temperature ranged from 100° to 103 3/5° F., pulse from 84 to 92 per minute.

On the 29th I received a phone message, telling me she was no better and would come to the sanitarium on the next train. She was admitted to the sanitarium on the morning of the 30th. Temperature 101° F., pulse 92, both ears discharging freely, tenderness over both mastoids, and sagging of the posterior superior canal walls. The nurse reported that since the paracentesis there had been a discharge of a large quantity of bloody serum from both ears.

I had engaged the operating room for an immediate operation, but her husband, who was a physician, insisted that we keep her under observation another twenty-four hours. Irrigations and ice to mastoids were continued, and a blood count and blood culture were made. The blood count showed a leucocytosis of 14,000; and the blood culture was negative. During the night the patient suffered severe pain, and was given a hypodermic of one-twelfth grain of heroin at 2 o'clock a. m. and one-fourth morphin at 4:30 o'clock a. m.

On the morning of October 31st I did a mastoidectomy on both sides. Cultures were taken from the cells of both mastoids, after removing the cortex, and a pure growth of streptococcus capsulatus mucosus developed. Both mastoids were of pneumatic type and filled with pus. All cells were exenterated and wounds were packed with iodoform gauze. Patient was put to bed and a pint of saline was given by Murphy method, and was retained. At 4:30 o'clock p. m. patient had a chill lasting fifteen minutes. Temperature went up to 103° F., pulse 108 per minute, respirations 26 per minute.

Next morning, November 1st, temperature was 102°, pulse 104. Outside dressing was changed, and temperature remained 102°, pulse 104 and 108 all day.

November 2nd, second day after the operation, outside dressing was changed and wound inspected. There was some redness and inflammation around the wound, especially the left, and hot boric acid stupes were applied constantly to both ears. Temperature remained 102° and 103°, pulse 110 to 116 per minute.

November 3rd, both ears were dressed. There was considerable swelling and redness around both mastoid wounds, extending up into the scalp of the left. Temperature ranged from 102° to 104° F., and pulse from 108 to 116 per minute, and at 6 o'clock p. m., twenty cubic centimeters of antistreptococcus serum were injected in left side, and hot saturated solution of magnesium sulphate was applied to left ear.

The morning of November 4th, temperature was 101° F., pulse 104, and outside dressing was changed. There were a few blebs around the margin of the wound on left side, and redness extending up into scalp and front. Patient complained of both limbs aching, and in the afternoon at 5 o'clock, temperature went up to 103°, with pulse 100. Twenty cubic centimeters of antistreptococcus serum were injected in right side. Hot applications of saturated solution of magnesium sulphate continued. Patient had a very good night.

November 5th, temperature ranged from 100 3/5° to 102°, wound was dressed, and inflammation was subsiding in the scalp and around the wound. On November 6th the temperature was normal in the morning, and in the afternoon went to 100°, pulse 78 and 80 per minute. After this the patient made a very rapid recovery.

CONCLUSION.

This case clearly demonstrates the importance of an early operation in a virulent infection of this nature. In this case, operation was performed on the fifth and sixth day.

In regard to the antistreptococcus serum, I cannot say whether it was beneficial or not. However, there was a drop of one degree in the morning and afternoon temperature on the day following.

One would conclude that the mastoid cells were infected simultaneously, or practically so, as the paracentesis afforded no relief, and the mastoids remained exceedingly tender.

Opiates were given against our best judgment, but the patient suffered almost intolerable pain, especially at night.

VI.

SOME OBSERVATIONS UPON THE MODERN MASTOID OPERATION.*

By John Johnson Kyle, M. D.,

Los Angeles.

The indications for the simple or the radical mastoid operation are not always well defined, and in consequence the personal equation of the operator has much to do with the choice of time, except in those cases with symptoms well marked.

In nearly every case of mastoiditis, either acute or chronic, we have a ruptured tympanic membrane. Many surgeons have probably operated for the cure of a chronic mastoiditis in which the tympanic membrane was intact at the time of the operation. In one case I found all the cells, except one, free from any evidence of disease. The one large cell was filled with a dark exudate. This case probably belonged to the neurotic type of mastoiditis, which is rare as compared to the inflammatory or infectious type.

I have had one case of acute double mastoiditis, combined with sinus thrombosis of one side, and complete loss of caloric reaction of both labyrinths with intact drums. The history was, however, that a week previous there had been a discharge from one ear.

Cases of acute mastoiditis do go on to spontaneous recovery, and many sufferers from chronic mastoiditis die from old age; nevertheless, I think it a serious error of judgment for one to treat either condition expectantly, after symptoms indicate the disease. Intracranial complications are so fatal and danger of operation so slight that one is not justified in presuming an acute or chronic purulent mastoiditis will recover without operation. If after a week in a given case of

*Read before the American Academy of Ophthalmology and Otolaryngology, Boston, Massachusetts, October 19, 20 and 21, 1914.

acute purulent inflammation of the middle ear, there persists a slight rise of temperature, with or without swelling or tenderness of the mastoid, and pus comes pulsating from the middle ear, I think a simple mastoidectomy is indicated.

If a temperature, that is, any above 100 degrees Fahrenheit, persists for forty-eight hours after spontaneous rupture or paracentesis, it is advisable to drain the mastoid. A meningitis may come on at any minute and have its origin either in the middle ear or mastoid process. Early drainage of the mastoid is the surest preventive of meningeal complications. Preceding any surgical attack of the mastoid in which brain complication is suspected, a lumbar puncture should be made and cerebrospinal fluid examined. A case of serous meningitis may recover, but from personal experience those with a diffused purulent meningitis do not.

The one symptom in acute mastoiditis that I have come to look upon as very nearly positive, with or without rise of temperature or tenderness of the process, is a pulsating discharge of pus from the middle ear. To get this distinct sign the ear should be cleansed so that a perfect view of the drum can be had. The pulsation is an indication of tension from rapidly forming pus in the antrum and possibly the mastoid process. The more pronounced the tension and pulsation, the more positive the indication for immediate operation.

Pain and swelling of the mastoid is a variable sign. A short time ago I performed a double mastoid operation upon an infant ten months of age. In this child there was no swelling or redness of the mastoid; there was, however, a persistent discharge for a period of three months, daily exacerbation of temperature and mild general sepsis. The absence of some postauricular swelling in an infant so young is unusual. In the above case, both lateral sinuses were covered with a soft necrotic mass and the antra full of pus.

In a few acute cases we have a slight discharge, no other general symptoms other than malaise, or possibly a slight rise of temperature upon exertion. In others, pain in some portion of the affected side of the head with discharge; while exceptionally we find a case with all the classical symptoms: pain, swelling, redness, tenderness, stiffness of the neck muscles, persistent discharge and pinched countenance—symptoms which any one should interpret.

Blood examination should be of value in deep complications where we have a sinus complication or meningitis. Sometimes in a beginning sinus involvement blood cultures are negative. More than one blood culture should be made. A bacteremia indicates infection of the blood stream, and may be present in a case of mastoiditis and due to infection in some other part of the body. Clinical symptoms of a mastoiditis are far more valuable than any blood examination. Acute cases when due to pneumococcus or streptococcus mucosus capsulatus infection, alone or mixed, are as a rule more fulminating and insidious than a streptococcus pyogenes or staphylococcus infection.

It is interesting to contemplate why apparently typical cases of mastoiditis go to spontaneous recovery and others require operation. Why in one case the infection confines itself to the air spaces of the mastoid process and in others spreads to the haversian canals of the squamosa. In those cases of spontaneous recovery the organism is short lived and has a tendency to confine itself to tissues of greatest vascularity.

In operative cases the organisms have a tendency to attack bone structures, sometimes blocking the blood supply of the bone and ending in early necrosis. The morphology of the organism governs the character of the tissue change.

Mastoiditis under some favorable conditions may become epidemic, and is due to the virulence of certain organisms with a predilection to middle ear cavity and mastoid cells. In some cases I have observed the pus from the middle ear filled with microorganisms, and when the mastoid cells were opened the extravasation within contained no bacteria at all.

My one case of mastoiditis from the Klebs-Loeffler bacillus ran a very protracted course. There was much pain in mastoid, little temperature, history of previous sore throat, some tenderness of mastoid and a white bulging drum. Thick yellow pus followed a paracentesis. The mastoid wound was unusually slow in healing, and pain persisted in the mastoid for many days after operation. Pain in the mastoid region following mastoidectomy from any form of infection varies in individuals, and may persist for a number of days after the patient becomes ambulatory. Dry heat, codein and aspirin usually relieves the irritation.

As a confirmatory evidence of the existence of an acute

mastoiditis, the value of radiography cannot be overestimated. The findings are as positive as in nasal sinus disease, and even more so. Each mastoid should be photographed separately; by doing so they can be more carefully compared. Not infrequently the extent of infection and area of the mastoid involved can be ascertained. In a case in which the operator is inclined to procrastinate or feel overconservative or in doubt, a radiograph should be made.

The symptoms indicating a radical mastoid operation are not always as well defined as those indicating the simple operation. One symptom, however, stands out preeminent, and that is a chronic foul discharge from the ear. This is indicative, as a rule, of caries, necrosis or cholesteatomata. It may be taken as an axiom that in all cases of a chronic discharging middle ear, regardless of the character of the discharge, a meningitis is always a possibility. Other indicative signs are labyrinthine symptoms, periodical or constant pain on the affected side, exacerbation of temperature and desire for life insurance.

In many cases the pathologic process is confined to the middle ear and antrum and may be relieved by curettement, ossiculectomy or medication. These cases are the exception, and the treatment cannot be other than empirical. With no indications to the contrary, it is a safe rule to do the radical operation in all cases of a chronic discharging ear.

There are only two or three conditions that may counterindicate a radical or semiradical operation in a chronic middle ear and mastoid suppuration. Patients in an advanced stage of pulmonary tuberculosis usually die following either a simple or radical operation. The vitality of the patient at such a time is too low to withstand the shock of the anesthetic, or repair the wound. Infusion anesthesia may be indicated in such cases rather than the American or drop method.

In preparing the patient previous to the operation, more care should be observed in women than in men, on account of the greater tendency to gastrointestinal disorders, especially diseases of the colon.

In the preparation of the site of the operation, it is needless to shave the side of the scalp in proximity to the line of intended incision. We should try to preserve the hair, and

not render our patients unnecessarily conspicuous. The postauricular wound usually heals in from one to five weeks; long before the hair, if clipped or shaved from the scalp, reaches its length worn by the patient.

It is a custom with me to paint the pinna and auditory canal and postauricular region well into the scalp with tincture of iodin. If the case is seen the day or a few hours previous to the time set for operation, the iodin solution is then applied. When the case comes to the operating table, if the skin is not unusually sensitive, the iodin solution is again applied. This is the only external preparation. Scrubbing, shaving, bichlorid packs, etc., I think unnecessary.

To prevent the hair from getting into the wound at the time of operation, strips of gauze are cemented along the edge of the scalp with collodion. These strips are easily removed, after the operation is completed, by moistening with ether. After the collodion strips have firmly adhered, sterile towels are bound about the head.

The auditory canal is now, as far as possible, cleansed by irrigating with a warm bichlorid solution (1/5000). Afterward the canal is filled with pure alcohol and plugged with cotton.

The anesthetic used is invariably ether, preceded sometimes one-half hour, if in extremely nervous adults, by one-fourth grain morphin and one-one-hundred-and-fiftieth grain sulphate of atropin. Ether is administered by the American or drop method. On two occasions I have given ether by intravenous infusion with happy results. The solution used was seven per cent ether and ninety-three per cent normal salt solution. We do not like gas-oxygen anesthesia, and this is not said to disparage those who favor this method of anesthesia. Our opinion of this form of anesthesia has been influenced by two nearly fatal results, and bad results frequently observed in medical literature. In an experience of over fifteen years we have had but two deaths from ether anesthesia. Postmortem disclosed one case to be a typical condition of status lymphaticus. We have exercised, however, the greatest care, and in only a few cases have we ever trusted a patient to a man who has not had some experience in the administration of anesthetics. It is only in the beginning that a deep anesthesia is necessary. If the anesthesia has been a prolonged one, we

sometimes use oxygen after the operation is completed, to hurry the elimination of residual ether in the lungs. A light anesthesia and rapidity in operating is the sine qua non of a mastoid operation. The less shock the more rapid the recovery.

Speed, consistent with safety, is essential to success. The antrum is reached, we think, more quickly with gouges designed by Alexander and driven by a mallet. The chipping away of bone should be begun with the largest size gouge and in the direction of the spine of Henle, and as we approach the antrum a smaller sized gouge may be substituted; in the hands of the skilled the operation upon the bony structure may sometimes be completed with a mallet and gouges. We should in this operation, or in any other, try to simplify our armamentarium. In the simple mastoid operation, after the cells are completely removed, the posterior bony wall of the auditory canal should be shaved down nearly to the annulus tympanica. In very young children this is not indicated. In adults the healing is simplified by allowing the membranous posterior wall of the auditory canal to drop back into the wound. Previously, however, and to prevent deformity, as much of the external wall of the tip is saved as is consistent with thorough exposure of all the tip cells. Previous to closure, the wound is thoroughly cleansed with peroxid of hydrogen, followed with alcohol. Afterward the periosteum and subcutaneous structures are firmly united with a No. 2 plain cat gut suture, except near the inferior angle of the wound. By careful attention to apposition of subcutaneous structures we avoid, in most cases, a depressed scar. At the inferior angle one or two stitches are usually taken, leaving an opening near the most dependent portion of the mastoid wound, and not larger than one-quarter of an inch, through which a strip of a five per cent iodoform gauze drain or small cigarette drain is gently passed into the wound in the direction of the aditus and antrum. Sometimes the gauze is softened by dipping in warm vaselin, which prevents adhesion to the exposed bone and tissues. We can see no good reason for firmly packing the bony cavity. There is a tendency among some operators to pack the wound too lightly and for a longer period of time than necessary. The less packing the smaller the scar and more rapid the recovery. After the cells are re-

moved the abscess cavity has a tendency to take care of itself, and therefore any artificial drainage is to be avoided. The tendency of a mastoid wound after the cells are drained is to go to spontaneous recovery, if we will leave the wound alone. The cutaneous structures are closed with Michel's clips in patients past the first year of life; if in an infant, the lips of the wound are closed with a ten day chromic catgut. The Michel's clips may be removed in from twenty-four to thirty-six hours. The sooner the clips are removed the less likelihood there is of a scar. The external surface is now cleansed and a layer of gauze saturated with pure alcohol is applied, and over this the usual dressing. In the great majority of our cases we have no postauricular depression, and very little scar at the line of incision, in either the simple or radical operation. A blood clot operation has nothing better to offer except, in a few favorable cases, a more rapid healing.

If the operation is performed in the morning, and on those past infancy, the external dressing is removed in the evening and a new dressing applied. Daily, and sometimes twice daily, the dressing is removed, the auditory canal irrigated with warm 1 to 5000 bichlorid solution, and a warm moist dressing applied about the ear and covered with dry gauze. By taking this precaution we save the patient a great deal of pain and hurry the recovery many days.

The patients are always pleased with frequent change of external dressing, pain is greatly relieved and sleep more assured. The patient is usually up and about on the fourth day. As soon as the gauze strip comes away moistened with serum or slightly tinged with pus, we permit the wound to close. It is unnecessary for the wound in the bony canal to be filled with granulations before the external wound is allowed to close. The treatment of the postauricular wound following the radical operation varies but little from that described above. We do not trouble ourselves with skin grafts.

After one week I try to discard the bandage. The wound is covered with a strip of gauze and cotton, half moon shaped, which fits behind the pinna and is held in position by collodion. If the posterior wound is slow in closing, we pass a cotton tipped probe saturated with phenol as far into the fistulous tract as it will go. One application of phenol is usually all that is necessary. A postauricular fistula may persist for

a long time and try the patience of Job before it is cured. Fortunately such a case is rare.

Sometimes where necrosis has been of long standing, or the cat gut fails to be quickly absorbed, healing is retarded by the formation of excessive granulations about the mouth of the wound. Cutting them away does not always stop their recurrence, neither does the application of escharotics prevent their growth. These cases are exposed to air and sunlight as long as possible. The patient may go a whole day with wound exposed. In winter the dry air of the house suffices, and in summer the free warm sunshine is sufficient to dry the granulations. It is remarkable how quickly these cases recover after the bandage is removed and the granulations exposed to the air and sunlight. The value of heliotherapy is given but little consideration by otologists. A treatment so simple and so natural should be applied more often. Air and sunlight are very essential and efficient in healing the middle ear cavity after the radical as well as the simple operation. In the radical operation, as soon as the patient becomes ambulatory, all dressing should be removed from the canal and the ear exposed for as many hours as possible to the rays of the sun. All forms of dressing retard repair. There is practically no danger of any new infection when the reparative process has once begun. A patient should not ordinarily remain longer than a week in a hospital for a simple or radical operation. The expense of a hospital to the average individual is very great, and sometimes eats up most of the money that should come to the physician. As long as the patient is free from temperature and able to be out of bed, there is no good reason why they should not report daily at the physician's quarters for dressing. Cat gut sutures are often a potent factor in retarding recovery. The longest period I recall of plain cat gut remaining unabsorbed was eight weeks.

As to the use of urotropin, we have used this drug in most cases of severe infections of the mastoid in which we suspected a possibility of some brain complications. There is sufficient literature on the subject to prove that the spinal fluid contains urotropin when administered per os to encourage one to use the drug. In young children and even adults the irritation to the kidneys is very great when the drug is given in large

doses. In infants the urine will be tinged with blood, and in adults great pain will be experienced upon urination.

As to vaccines, I have come to believe in them after operation, and not before. I have had what appeared positive results from vaccines in acute mastoiditis, only to have a second attack, fulminating in character, come on a few weeks after the ear was apparently cured. Where the antrum was exposed four to six hours after the second attack, it was found to be filled with débris. I am rather skeptical about the efficiency of vaccines in suppuration in closed cavities, such as the nasal sinuses and mastoid antrum and process. If the case is fulminating, and one organism is present in the pus from the canal, I give that vaccine at the operating table, and if more than one organism, I give the mixed vaccines, and they are known as stock. It is a reasonable presumption that autogenous vaccines are more potent than stock vaccines, but unfortunately in the great majority of cases we do not have time for the preparation of autogenous vaccines, and even had we time, our faith in stock vaccines prepared by the Lederle Laboratory in the East or the Cutter Laboratory in the West is greater than in an autogenous vaccine prepared by some one who is not a specialist in such therapy. It would be better in the preparation of vaccines to secure the pus from the mastoid wound rather than the auditory canal, and in virulent cases from the bone chips as well as from the free pus in the mastoid.

The accidental exposure of the dura or lateral sinus in the simple or radical operation, as far as I am able to judge, is free from danger. It is reasonable to presume that in the exposure of the dura or sinus we avoid cutting or tearing the tissue. A meningitis or phlebitis, if it occurs, has had its inception before operation. The dura has a very strong natural resistance to infection, and the resistance is much greater after the free drainage is established. Meningitis or thrombosis are diseases with a predilection to precede rather than to follow a mastoidectomy. Whenever the sinus wall is found diseased, it is my practice to widely expose the sinus so that imperfect drainage cannot produce phlebitis.

The socalled Heath operation has many points to recommend it to the otologist. The removal of the posterior bony wall of the canal down to the annulus tympanicus, with the formation

of a flap, for the cure of acute mastoiditis, is not an unsurgical procedure. By so doing we avoid filling a deep cavity with fibrous tissues, prevent the recurrence of mastoiditis, and secure more rapid healing. In the few cases that I have used this method the results have been perfectly satisfactory. The one disadvantage of all flap operations is the tendency to accumulation within the canal of cerumen mixed with débris. Very often cases require attention, at intervals, for many years.

In the consideration of the radical mastoid operation, the preservation of the ossicles, tympanic ring and some of the tympanic membrane, as advocated by Heath, Bondy, Ballenger, Botey, and many others, has given me, as it has most operators, a good deal of concern. We are idealists and are looking for ideal results. It remains a question of dispute as to the advisability of trying to retain the ossicles and tympanic ring, and probably will be discussed for years to come. It is impossible to tell anything of the necrosis of the ossicles until they are removed. Since the incus and some part of the malleus is destroyed in nearly all chronic suppurations of the middle ear, and the chain of articulation broken, the removal of the necrosed ossicles does not jeopardize the hearing. The size and shape of the drum may govern the indication for or against any effort to retain the tympanic ring and ossicles. Where the tympanic membrane is destroyed and the antrum filled with cholesteatomata, it is best to do the classical tympanomastoid operation. If, as far as the eye can detect, the ossicles are intact, the drum membrane not in apposition with the inner tympanic wall, and no symptoms that would indicate the possibility of a labyrinth irritation or meningitis, an effort may be consistently made to save the drum membrane and ossicles.

I presume I am subjecting myself to a good deal of criticism when I say that I seldom ever pay any attention to the orifice of the eustachian tube in the radical mastoid operation. The tube as a factor in prolonging any suppuration after the radical mastoid is, we think, overestimated. The cause of any failure to secure a dry ear is, as a rule, outside of the eustachian tube. Advisedly speaking, the cause is a disease of the bony structure which surrounds the antrum, and particularly along the aditus ad antrum, that retards recovery.

VII.

HEMORRHAGE FOLLOWING REMOVAL OF THE FAUCIAL TONSIL.

By F. F. Agnew, M. D.,

Independence, Iowa.

The timely warning given by Virginius Dabney concerning hemorrhage following "Radical removal of the faucial tonsil," published in the December number of Annals of Otology, Rhinology and Laryngology, should be given heed and the tonsil operation made strictly a hospital operation, where the patient may be observed closely until all danger of complication is past, and should be performed only by those equipped to meet such complications, should they arise.

At the time of publication of Dabney's paper I was having an experience of this kind, the report of which I withheld until the result was complete.

Patient, Hazel K., six years old, was brought to the hospital on November 25th for removal of tonsils, which had caused much trouble. Child slender and rather pale, mouth breather from adenoid obstruction. Family history negative, except that one year ago mother had severe hemorrhage during abortion of unknown cause. Conditions seemed no different from those surrounding other similar cases.

Operation at nine o'clock in the forenoon. Tonsils removed by blunt separation of pillars and completed with cold snare. Nasopharyngeal space curetted for adenoids. Bleeding slight, and patient put to bed in apparently good condition. Two hours after operation there was sudden severe hemorrhage of large amount arterial blood, which was controlled by nurse, who applied gauze soaked with adrenalin to fossa and at the same time compressed carotid artery. I saw her in about ten minutes and put her on table for examination. The hemorrhage was too profuse to permit of ligation and a tonsil clamp was applied. Patient semiconscious, extremely pale, with

widely dilated pupils and no pulse at wrist. Was placed in bed with feet elevated, and oxygen given with salines per rectum and subcutaneously. There was gradual recovery, and at the end of twenty-four hours the clamp was removed. The fossa looked clean and there was no bleeding. On the fifth day she had recovered sufficiently to be taken to her home, five miles in the country.

On the ninth day following the operation she had retired and been asleep for one hour. The father, while putting another child to bed, was attracted to her bed by a gurgling sound, and found her bleeding profusely from the mouth. The mother, who possessed much presence of mind, compressed the carotid as she had seen the nurse do. Yet the bleeding was quite as severe as at the time of operation. On my arrival a clamp was immediately applied. Same restorative measures were used as before, the patient responding well. With a nurse in charge, the clamp was left thirty-six hours, when she was again brought to hospital. Examination of throat showed a space one-third by one centimeter in the upper third of the posterior pillar of the fossa, where the muscular fibers were torn away, and presenting in this space was an artery about the size of a quill, which I believed to be the internal carotid in an anomalous position, the walls of which appeared sloughy. Deeming it unwise to temporize or attempt ligation through the mouth, as further hemorrhage seemed imminent, I decided to ligate the common carotid, which was done at once. The wound became infected and was slow in healing, but closed two months ago, leaving but a small scar. The child is in splendid health and attending school regularly.

Having had such an experience, and three years ago a death on the table from chloroform before operation was well begun, I feel that to emphasize the warning of Dr. Dabney is justifiable, and that this operation should be placed in the class of major operations, where it certainly belongs.

VIII.

REPORT OF TWO CASES OF FOREIGN BODY IMBEDDED IN THE WALL OF THE PHARYNX.*

By Charles N. Cox, M. D.,

Brooklyn.

Case 1.—J. W., male, aged forty-four years, came to my office February 17, 1910, complaining of pain and purulent discharge from the right tonsil. He said he was subject to attacks of quinsy; that he had his tonsils removed fourteen years previously, but that he had continued to have attacks. About two months previous to his first visit to me he had more of his tonsils removed, since which time the discharge and pain from the right tonsil had been continuous.

Upon examination I found a heterogeneous mass of soft palate, pillars, tonsil tissue, and cicatrices on the right side. Pus was exuding from two or three sinuses—most from one at the apex.

I put a bistoury into the sinuses and slit them open. This relieved the patient of pain, and the discharge became very slight, but still persisted.

March 29th I endeavored to clear and drain the supratonsillar fossa by removing remains of velar portion of tonsil with a punch—not an easy task, I can assure you, on account of loss of landmarks and great distortion.

A few days later, I laid open a deep sinus, apparently reaching bottom. I then curetted and swabbed out with tincture of iodin. This seemed to end the trouble, and in a few days the patient passed from under my observation.

On November 11th, following, he consulted me again, stating that he had been very comfortable since last spring (seven months previously), but that there had been a bad taste and odor frequently of late. This morning he felt something in the throat, back of the palate, and this afternoon he expelled from the throat this piece of drainage tube. He then in-

*Read at the Eastern Section of the American Laryngological, Rhinological and Otological Society, January 9, 1915.

formed me that during a particularly bad attack of quinsy in May, 1909, his physician, a general practitioner, after incising the abscess, had put in a drainage tube. In a day or so following, the doctor, being unable to find the tube, concluded the patient had swallowed it. Another one was introduced and removed in a day or two.

I found, upon examination, a sinus leading through the supratonsillar space and emerging at the lateral wall of the pharynx, behind and above the right posterior pillar.

The discharge and all symptoms ceased in a few days, the sinus closed, and he has had no trouble since.

It seems almost unbelievable that a foreign body such as this should have remained so long without being discovered. Yet its presence was not evident or suspected two months before I saw the case; nor was it manifest in any of my own cutting, probing or curetting.

Case 2.—E. M., male, aged twenty-three years, was brought to me by his family physician, May 5, 1910. The patient had had no throat symptoms whatever, but the doctor discovered, quite accidentally, some foreign body in the nasopharynx, barely showing below the velum.

The mass had the appearance of a calculus; it was hard and firmly imbedded in the right lateral wall of the pharynx, and could be seen just at the edge of the soft palate. I seized it with forceps and gently rotated it until extraction was possible. When this was accomplished it was found to be a thirty-two caliber bullet. No bleeding followed. A large, crater-like cavity was left, with indurated, infiltrated walls.

When patient was asked if he had ever been shot, he replied: "Why, yes. Fourteen years ago I was accidentally shot at close range by a playmate." The ball had entered through the skin over the left canine fossa, where a small scar was still to be seen. The patient further stated that several teeth were loosened, and that there was a small hole in the roof of his mouth for a short time after the shooting, but no sign of it could be found.

The wound of entrance, the loosened teeth, and the palate lesion—the only ones of which the patient was cognizant—promptly healed, and the incident had been forgotten until, fourteen years afterward, the offending missile was discovered, quite by accident, and removed.

IX.

TWENTY-FIVE CASES OF VINCENT'S ANGINA SUCCESSFULLY TREATED WITH SODIUM PERBORATE—SPECIAL REPORT OF THREE CASES.

By H. H. Stark, M. D.,

El Paso.

I have been struck with the lack of information gained from the textbooks on the subject of Vincent's angina, especially the treatment. Osler (1912) does not treat it as a distinct disease, but mentions it only in connection with diphtheria. Strompel (1913) does not mention it. Kerr mentions it, but suggests nothing in the way of treatment. Ballenger, second edition, does not mention it; he takes it up in the third edition, but gives nothing new on the treatment. Brown, "Oral Diseases and Malformations," does not mention it. In the other works in which it is mentioned, the treatment is given principally along the old lines, such as tincture of iodin, silver nitrate, potassium permanganate, etc. Judging by the recent literature, the tendency at the present time is toward the use of local applications and salvarsan. I therefore think it may be acceptable to the profession to call their attention to a series of twenty-five cases treated by myself in the last two years, with the observation of at least that many more, which were treated by my colleagues, with a report on three of the cases showing special interest.

In my observation of these cases I have been particularly struck with the lack of ability on my part to differentiate the gross lesion from that of syphilis and diphtheria, and believe with the authorities who agree on the diagnosis being made by the finding of the spirochetæ and the fusiform bacilli in smears taken from the lesion. In all of these cases reported these microorganisms have been found present, with one or two ex-

ceptions. In three or four cases there was an apparent absence of the spirochete, which may have been due to faulty staining technic, as they sometimes do not take the stain well. All examinations were made by Dr. Willis W. Waite, of the Crouse laboratories, so I feel sure of the diagnosis. I also feel sure that this is the only accurate way to differentiate this disease from the others of like gross appearance.

In the handling of these cases I have noticed that the disease is most often confined to softer and more easily invaded tissues, the tonsil being the seat of the majority of infections. Following this have been the hard palate and the gums, followed by the tongue, and in some cases an invasion of the bone, the bone infection usually coming in children. It takes on two distinct forms: one, where the tissues are necrotic with a slough and exudate; the other, where there is very slight exudate, and the process, if confined to the tonsil, being apparently a clean-cut surface, with progressive loss of substance. This form, I believe, to be responsible for most cases of necrosis of the tonsil that have been reported. I feel sure that one of my cases, diagnosed by me as tonsil necrosis, several years ago, in which there was no microscopic examination made, and in which there was a complete loss of tonsillar substance on both sides, without invasion of the pillars, to have been this disease. The second form of this disease is sometimes found in the tonsillar crypts, in which we can see no loss of substance, and runs a chronic course. The most noticeable feature of all forms is the persistent aching pain complained of by the patient.

TREATMENT.

Up to two years ago I had treated all cases of Vincent's angina with every conceivable substance mentioned in the textbooks, with uniformly slow recovery and relief from pain. Two years ago, Dr. Henri Letord, a dental surgeon, called my attention to sodium perborate ("New and Non-Official Remedies," 1912, page 226), with which he had recently treated a case of Vincent's angina of the gums. I immediately began the use of this substance, with uniform success. A common mistake is considering perborate of soda to be the same as the common borax of commerce. The perborate splits up in the mouth, forming nascent peroxid of hydrogen. It is usually

prescribed in a powder, two teaspoonfuls dissolved in a glass of water, this making a saturate solution, which is to be used frequently as a mouth wash and gargle. It is exceptional to find a case in which the pain is not relieved within twenty-four hours and a cure within a short time.

I herewith report three cases that have been of special interest to me, illustrating some of the points mentioned above.

Case 1.—The first case in which sodium perborate was used was that of a Mexican woman, about thirty-five years of age, in the charity clinic. She came in with a history of having had trouble in her mouth for about three months, the pain having been so severe for the last week that she could not eat or sleep. On examination it was found that both tonsils were affected, the tongue fissured, with small ulcers on the buccal side of the gums; smear taken, and fusiform bacilli and spirochetæ found. Diagnosis, Vincent's angina. She was placed on a mouth wash of sodium perborate, with no other treatment. Within twenty-four hours the pain was so much relieved that she was eating and sleeping fairly well. The treatment was kept up for three days, with marked improvement; then changed to borax, thinking perhaps that the borax salt had the specific effect that zinc sulphate has in Morax-Axenfeld bacilli of the eye; the pain promptly returned, and the process was again progressive. She was then treated with nitrate of silver solution, iodin, chromic acid, and potassium permanganate, successively, but each of these failed to relieve the trouble, when she was again put on sodium perborate, and went on to an uneventful recovery. This case was, evidently, one of the slow progressive type, with little exudate, and during the progress of the disease there was practically a total loss of the tonsillar substance on each side, without invasion of the pillars.

Case 2.—American child, aged three years; gave a history of having sore mouth for six weeks; pain was intense, for the last four days and nights unable to sleep. Examination showed a large patch on the hard palate, opposite first molar tooth, covered with a gray exudate; smear showed fusiform bacilli and spirochete. Diagnosis, Vincent's angina. The exudate in this case was not removed. The child was immediately placed on a mouth wash of sodium perborate—about

ten in the morning—and used a number of times that day. The pain was relieved so much that she was able to sleep that night. The ulcer completely healed in two weeks. This case illustrates one of the type of cases that is very difficult to make a diagnosis in the gross lesion, differentiating it from syphilis and diphtheria. In addition to the microscopic findings, the diagnosis was made by the intense pain caused by the ulcer.

Case 3.—Mexican child, aged three and one-half years, referred from the County Children's Clinic; gave history of having had trouble with mouth for three months; unable to eat or sleep within the last few days. Examination showed right side of face swollen; had ulcer on buccal side of right upper gum as large as a quarter, covered with exudate; breath very foul, and child apparently suffering great pain. The patient was immediately put on a solution of sodium perborate without removing any of the exudate, and was not seen again for two days. On returning found pain practically gone, general condition of the mouth much improved. Returned again in three days, when, on examination with a probe, it was found that where the exudate was removed a piece of bone was uncovered and movable, which on being removed brought with it the upper molar tooth, a portion of the alveolar process, and the germ of the cuspid, in one piece. The use of perborate of soda was continued, and the case went on to uneventful recovery.

This illustrates one of the cases where the process had gone on to an invasion of the bone, due, no doubt, to the nonresistant power of the soft tissues of the child. I think with further investigation it would be found that the microorganisms of Vincent's angina are not confined to the mouth, but may be conveyed to most of the tissues of the body.

CONCLUSIONS.

Vincent's angina is a far more common disease than it is given credit for being. The diagnosis is difficult in gross lesions, and in suspected cases there should be an examination microscopically for the combined spirochetæ and fusiform bacilli. That sodium perborate in my hands has given me uniformly good results. It is a simple remedy, without danger; will ease pain promptly and cures within a short length of time.

X.

THE OPERATION OF CHOICE IN MAXILLARY SINUS DISEASES.*

By George Paull Marquis, M. D.,

Chicago.

In presenting this brief paper to you it is not my purpose to burden the society with a treatise on the treatment of empyema of the maxillary sinus nor the indications for operation or technic of the various operations, for all of these subjects have been thoroughly covered before this society in previous meetings, but I propose to point out a few of the advantages, and at the same time mention the only disadvantages that I know, connected with the operation devised by Prof. Alfred Denker of Halle, and which goes under the name of the Denker operation.

To some extent it will be necessary, for the purpose of comparison, to mention the various methods which have been suggested by other authorities, in order that we may see wherein the one or the other method is superior.

To my mind the question of the greatest importance which is to be decided in the choice of a particular operation is: Which will give the patient the greatest probability of a cure? And this naturally must be answered by the operator after weighing the following points:

(a) Which method will permit him to do the most thorough work?

(b) By which method can he gain access to each and every part, depression and bay in the maxillary sinus?

(c) By which method can he not only gain access to but also inspect each of these parts?

(d) Having cleaned out the sinus, which method is followed by the most rapid healing?

(e) Following which method are the parts more nearly in

*Read before the Chicago Laryngological and Otological Society, October 29, 1914.

their normal relation and the antrum least liable to reinfection in the future?

(f) Will the operation in question be followed by unpleasant or even serious symptoms, such as localized areas of anesthesia or severing the nerves, occlusion of the nasolacrimal canal, facial deformity, fistula into the mouth, etc.?

As the Denker operation is never resorted to except in chronic cases, we shall pass over all the various methods of procedure in the acute and subacute cases and come at once to a comparison of the methods employed to relieve the chronic case.

The simplest of these is the one devised by Krause—and later improved by Mikulicz—Hajek, Menzel and others.

This, as you know, consists in amputating the anterior third of the inferior turbinal and making a large opening from the inferior meatus to the antrum.

There is one very decided advantage in this operation over all others—the ease with which it is performed; but beyond that and the fact that it allows thorough washing out of the sinus, it has nothing to recommend it.

I realize fully there are a number of cases where all that is necessary is to make a large opening and employ frequent washings to effect a cure, and to this class of cases the Krause operation is particularly adapted; but where we have a case with polyp formation, localized areas of bone necrosis, etc., the mere establishment of drainage will not suffice—the offending parts must be thoroughly cleaned out. The Denker operation opens a wide field of view and allows one to proceed under direct vision rather than scraping blindly in the dark, as is sometimes done in the Krause procedure.

Then again the Krause sacrifices a part of the inferior turbinate. This was also done in the original Denker, but as now practiced by him the turbinal is preserved.

Cordes of Berlin was one of the first to advocate the preservation of the turbinal in the Denker operation, and he considers the operation with this modification the most satisfactory and successful method thus far advanced.

In short, the Krauze-Mikulicz, in the light of a socalled radical operation, has almost nothing to recommend it. In the way of establishing drainage and permitting lavage of the cavity, it has its place in the list of operative procedures, but

has no value that would even let it be compared with the Denker.

The operations answering some or all of our requirements as to indications are known as the Kuster Desault, the Luc-Caldwell, the Boenninghaus, Friedrich, Kretschmann, Canfield, Denker. Comparing the points of superiority in these, we find the Kuster Desault does not compare with the Denker in the field to be inspected; then, too, this method maintains an opening into the mouth which not only subjects it to constant reinfection, but the patient's appetite is decreased, and all of the unpleasant symptoms of pus draining into the mouth are experienced. The canula, which has to be worn, acts as an irritant, and before long the opening is encroached upon by granulations. The method has all the disadvantages of any of the radical operations and none of the redeeming features of any of them.

The Luc-Caldwell is probably the most universally performed of any of the radical operations on the antrum, and has proven successful in the hands of a great many operators.

In considering a few of the relative advantages of this and the Denker we find:

"Access to all parts of the cavity for inspection." We know there are in the maxillary sinus a number of bays or depressions. Especially is this true of the anterior angle; and this part is practically inaccessible to inspection by any method except the Denker. It is true the Luc-Caldwell has a large lateral opening, but that does not permit of inspection of the anterior angle, the very part that is removed or thrown into direct communication with the nose by the Denker.

As to the ease with which the methods can be employed, it is naturally one of opinion; but I am free to say that in my own experience, and after watching a number of others perform both operations, the Luc-Caldwell is more difficult than the Denker.

Concerning the next point of comparison, that of relative degree of normality of the structures and probability of reinfection, the Denker far surpasses the Luc-Caldwell; for in the latter the chief point of advantage, as put forth by its supporters, is the large opening into the sinus from the nose and the easy access after resection of a portion of the inferior turbinal. But this very act weighs against the oper-

ation under this particular consideration, for the structures are certainly less normal with the part of the turbinal removed, and there is greater liability to reinfection with the protecting turbinal gone.

One of the strong points in favor of the Denker is the maintaining of the nasal structures, i. e., the turbinates, intact.

With regard to the rapidity of healing, we have again to give precedence to the Denker.

Hajek states, in describing the Luc-Caldwell operation, that months, sometimes even a year, is necessary for the sinus to completely heal.

In a series of Denker operations the longest time I have seen until complete healing had taken place was thirty-three days; the usual time is about three weeks.

This can be explained in two ways. With the cavity open to thorough inspection, the removal of all diseased parts can be more completely carried out, which would naturally facilitate healing rather than if a focus of suppuration were left to continue the discharge and retard complete recovery.

Then again the covering of the floor with the membranous wall of the nose, as practiced by Denker, reduces the time necessary for healing by a decided margin. Objection has been raised that this flap would not unite, but would curl up and slough, thus retarding, instead of promoting, the healing. I must confess that I too was formerly of this opinion; but a series of cases has convinced me that I was wrong, and that if the bony cavity is completely denuded, the membranous flap will readily adhere and greatly lessen the time necessary for complete recovery.

Robertson divides the flap into four portions, folding them so as to cover the four bony surfaces of the opening. He claims by this to prevent the opening from ever closing, as the entire bony orifice is covered. I have had no experience with this method, so cannot testify as to its worth. But I should think there would be more danger of the small flaps curling up. And as to the closing of the opening, which he says this prevents, I have never seen one close following a Denker with the single flap turned back on the floor.

As to the sequelæ, there may be some slight advantage in the Luc-Caldwell, if my conversation with operators is borne out.

I have found with the Denker that the nerve supply to the front teeth as far as the bicuspid is interfered with. This is readily understood when we consider the distribution of the anterior and posterior dental branches of the fifth nerve. The anterior dental is given off from the infraorbital while in the infraorbital canal, and passes down through the substance of the superior maxillary bone in a special canal in the anterior wall of the antrum and communicates with the posterior dental. Filaments are distributed to the canine and incisor teeth, and others to the lining membrane covering the forepart of the inferior meatus.

The Denker operation, removing as it does the anterior wall of the antrum and the apertura pyriformis, cuts these filaments and causes a loss of sensation in these teeth.

I can see, where the opening is made into the antrum through the canine fossa and the anterior wall left, that one would escape this disagreeable complication.

I have also had one other unpleasant experience, in that the infraorbital nerve came through a canal unusually low down on the superior maxilla, and I probably removed the wall of the antrum a little too high—at any rate, I had a numbness of the cheek and lip following the operation. This I have seen on only one occasion, although the numbness of the three front teeth has occurred in all my cases. One would expect an occasional injury to the tear duct with a probable stenosis resulting, but a survey of the literature reveals only three cases. One reported by Hajek, one by Koffler, and a third by Skillern. I have not seen this complication in any of my cases, either in the Denker or Luc-Caldwell method, though I must confess my experienec in the latter method is somewhat limited, as I have discarded it entirely for the Denker.

The Boenninghaus method is practically the same as the Luc-Caldwell, except that in addition to laying back the nasal membranous wall into the antrum, he tampons the membrane around the opening in the canine fossa into the antrum, and maintains an opening from the nose through the antrum into the mouth. He claims by this method to be able to keep the field under observation throughout the entire process of healing; but the constant irrigation that is necessary and the large opening into the mouth with the drainage there, is such a

drawback that I think it is not to be compared with the Luc-Caldwell, let alone the Denker.

Friedrich was really the first one to hit on the idea of the anterior angle of the antrum by removing the wall of the apertura pyriformis, but he made his initial opening through the skin along the external angle of the nose, and the attendant scar makes this operation less advisable than the Denker.

Kretschmann followed the idea of Friedrich, but made the incision from the mouth, under the upper lip. However, he did not remove the anterior wall for fear of deformity.

Denker now joined the Friedrich with the Kretschmann, and making the incision through the mouth he removed the anterior wall.

Canfield has practically the same operation, except that he makes the incision through the nose. The results are the same as the Denker, and the operation is the same except the incision; so that the only comparison of these two methods is, which will allow better access to the field of operation; and I am of the opinion that the Denker will allow greater retraction of the soft parts and give a larger field in which to operate than the Canfield.

Skillern has recently come forward with a very effective and at the same time simple operation. He makes a vertical incision in the nose anterior to the inferior turbinate. He then excises an elliptical strip of membrane and proceeds to free the membrane from the nasal wall, and also the periosteum from the anterior surface of the superior maxilla. With the pyriform aperture now exposed, and the lateral and anterior surfaces of the bone freed from its coverings, he removes the bony ridge of the pyriform aperture, and continues the opening on to the anterior surface until he has a sufficiently free opening to give him easy access to the cavity. He then removes the lateral wall in the same manner.

After the sinus is cleaned he packs it for several days, and does his dressings through this nasal opening, using cauterizing methods to prevent its closing before the healing is complete.

This operation has in its favor:

1. It is easily performed and can be done under local as well as general anesthesia.

2. It gives a good field of observation—better than the

other intranasal operations, with the exception of the Canfield.

For the cases of empyema without polyp formation or bone necrosis, it should afford as good a result as the Denker or any other operation, and is certainly more easily performed; but where we have either of these conditions present, this operation does not allow the complete inspection of every bay and depression in the sinus that the Denker affords. It is true, we can accomplish much more since Holmes has given us his very valuable nasopharyngoscope; but even with this we have a reflected image, while in the Denker operation we have a direct view of the entire cavity.

To sum up the advantages of the Denker: Under each one of the standards of comparison it is superior to all the others except the Canfield. It apparently gives a larger field, through retraction of soft parts, than this latter one. The only disadvantage that can be brought against it is the loss of sensation in the three front teeth. How permanent this is I am not able to state, as all but four of my cases have been lost sight of. These four have been operated within the last year and still have the numbness referred to.

I am not so sure but that the idea of Kretschmann, in leaving a small part of the anterior wall and resecting the entire nasal wall, might accomplish the same result and spare the sensation in these teeth.

XI.

THE DIFFICULTIES OF CLOSING A PERFORATION OF THE DRUM MEMBRANE IN CERTAIN CASES OF ACUTE SUPPURATIVE OTITIS MEDIA.*

By Gorham Bacon, M. D.,

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At a time when there is so much discussion about and interest in operative work in otology, I feel a certain amount of hesitation in presenting this subject before the section of otology, although a most important one.

Anyone who has had much experience in treating aural cases will at times have under observation a case of acute suppurative otitis media in which it will seem almost impossible to close the perforation in the membrana tympani. The cases usually begin with or without any pain, and the inflammation being quite severe, the drumhead ruptures spontaneously, and generally before being seen by a specialist.

The following cases are a few of those that have come under my care:

A young man, aged eighteen years, in July, 1910, complained of a sudden fullness in his right ear, and in a short time noticed a serous discharge. There was little if any pain, and as he was in such good health he did not consider it necessary to consult a physician, as the discharge ceased in a few days. About six weeks later I saw him for the first time, and although he told me that his ear gave him no trouble, I found, after removing a few drops of pus, a small perforation in the posterior and inferior quadrant of the drumhead. As he was going away I advised him to syringe his ear, and prescribed some astringent drops. After a few days' use of these drops, the discharge becoming quite profuse, I immediately changed to the socalled dry treatment. I first, however, touched the

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edges of the perforation with a very weak solution of silver nitrate (three grains to one ounce), and then insufflated boric acid powder. The discharge immediately became so much less that in a week's time, by following this treatment each day, the perforation closed.

In the second case the patient came quite irregularly, and when the discharge ceased, discontinued her visits for some time. When she returned, however, I found a fairly good sized perforation, linear in shape, in the posterior portion of the membrana, but there was no discharge. I treated her in the same way, by touching the edges of the perforation with nitrate of silver, insufflating powders, and at times applying a small disc of paper over the perforation.

The third case was a long and tedious one, and the treatment extended over many months. The patient, thirty years of age, on October 3, 1911, accidentally punctured her drum membrane with a hair pin. She consulted a physician, who washed out the auditory canal and gave her some drops, and when I saw her about a week later she had an acute suppurative inflammation of the middle ear. Under the use of astringent drops the perforation seemed to grow larger and the discharge did not decrease in amount. The insufflation of powders was then substituted, and in a comparatively short time the ear was absolutely dry, but there was a large perforation in the posterior inferior portion of the membrana, involving about a quarter of the entire drumhead. Solutions of nitrate of silver were used to touch the edges of the perforation, and discs of paper were applied and left in situ for a long time, but when removed the perforation was as large as ever. It was interesting to note that the hearing was much improved when the paper disc was in position. Politzer says that "an operation for the closure of a perforation should be undertaken only if the hearing distance is thus increased or at least not diminished." I do not agree with this statement, for I much prefer to close a perforation with cicatricial tissue, even if there should be some diminution in the hearing, provided the case were fully stated and explained to the patient.

As the perforation in this case did not show any tendency to heal under the use of the silver nitrate solution or the paper disc, I tried a method advocated by Politzer, and I met with

complete success. But not until the first week in April, six months after the patient first came to my office, was the membrana entirely closed with new tissue, although partly adherent to the inner wall of the middle ear. The tinnitus disappeared, the patient could hear a low pitched voice at a distance of twenty feet, and the whisper at twelve feet. The treatment which I employed in this case was the cauterization of the edges of the perforation with trichloracetic acid, as recommended by Okuneff in 1895.

The method of Gomperz, as given in Politzer's book, is as follows: A piece of cotton soaked in a ten per cent solution of cocain is inserted in the perforation and allowed to remain ten minutes. Cotton applied to a probe is then dipped in a concentrated solution of the acid and the excess wiped off by means of a small piece of dry cotton. "A white eschar forms, on the separation of which it is seen, even after one or two applications, that the perforation has grown smaller." The cauterizations should be repeated at intervals of from four to eight days; the number of applications varies according to the size of the perforation, and is generally from three to fifteen.

I followed out practically all the above suggestions, except that I substituted a four per cent solution of cocain for the ten per cent solution, and insufflated boric acid powder after applying the acid. I feel very enthusiastic about this method and have used it successfully in other cases. It seems to me to be particularly indicated in all old dry perforations, where, according to Politzer, "the most frequent anatomic cause of the persistency of perforations is the growth of the epidermis of the external layer of the membrane over the margins of the orifice into the tympanic cavity, thus preventing the formation of a cicatrix." "This procedure," says Politzer, "is contraindicated when the membrana tympani is defective in its entire extent, in perforation of Shrapnell's membrane, and in cachectic individuals." In the first two cases the perforations were smaller, and the application of silver and the use of powders and the paper disc, as advocated by Blake, effected a cure; but in the third case nothing seemed to be of any benefit until I tried trichloracetic acid.

Blake's method of applying a disc of paper a little larger than the perforation seems to be useful in only a limited num-

ber of cases, viz., those in which the perforation is small and the inflammation has subsided and there has been cessation of the discharge, the external surface of the drumhead having resumed a normal condition. It may also be applied to advantage in cases of rupture or mechanical injury, the paper dressing keeping the edges of the wound in apposition. Blake uses writing paper, and the sizing used in finishing the paper, when moistened, is sticky enough to make the paper adhere to the membrana tympani. Such a disc is best introduced by means of a probe tipped with cotton and dipped in water so that the paper adheres to the moistened cotton until it comes in contact with the membrana tympani. The disc of paper should then be pressed firmly into position by a cotton holder tipped with dry cotton.

Milligan recommends the application of a small disc of salicylic acid plaster to the perforation, which sets up a certain amount of local irritation, but I have not as yet tried this method.

XII.

OPERATIVE TREATMENT OF CLEFT PALATE.*

By John E. MacKenty, M. D.,

New York.

In presenting this subject, I am well aware that a small library would not contain the mass of literature at present surrounding it. My apology is that, of necessity, every operator in this discouraging field must view it from a slightly different angle, and thus may add an idea or two to its betterment. That so few surgeons are actively interested in the correction of this deformity may be due to the feeling that the last word has been said; that the operative treatment has reached its limit of perfection, and withal a large percentage of failure remains—not so much cosmetic, perhaps, as functional. For, in spite of a well accomplished operation, correct speech does not always follow. This latter failure is not so evident among the well-to-do as in the poorer classes, from which a very large percentage of our cleft palates come. It sometimes takes years of persistent teaching to make the surgically cured palate functionate, and the uneducated poor have not the intelligence, the time or the money to follow this course of training. Then, there are the cases living in the country districts, where proper training is not available. My experience convinces me that the percentage of speech failure is much larger than that of surgical failure. In my cases operated on after the tenth year, speech improvement in many cases was negative. Where the Lane operation was done, or where there was much cicatrization and contraction of the soft palate, speech was but slightly improved at any age. Nor can I see much hope for such cases in that direction. Where operation was done at an early age (in the first or second year), and the soft palate was carefully preserved intact, I have had

*Candidate's thesis, presented before the American Laryngological Association, 1914.

some very satisfactory results in speech. Therefore, I would here set down two rules: First, that the operation be completed before the end of the second year, and second, that all operations that split or deform the soft palate in any way should be done only as a last resort.

The operations which have for their object the crowding together of the separated maxillæ in infancy, though attractive in theory, and at times showing excellent results in practice, have had in the hands of many operators too large a mortality to be undertaken in a routine way. Besides, they are applicable only to cases with complete clefts (in which hare lip is nearly always present). In this type of case the early closure of the lip exerts a strong reducing effect upon the cleft, narrowing it to a point where a safe operation can be done, thus, to a considerable extent, eliminating the need of the more dangerous operation. I have observed that the eruption of the teeth approaches nearer to the normal when the closure is brought about by gradual lip pressure. The complete cleft is rarely as difficult to close as the incomplete one, in which this type of operation is not applicable. Here I may state a third rule: Close the hare lip as soon after birth as the child's condition will justify. If the premaxilla protrudes so that the lip cannot be closed over it, fracture it and wire it to the arch at the same time. If the lip can be closed over the displaced premaxilla without undue tension, do not fracture the premaxilla, since the lip pressure will do the moulding much more perfectly than can the surgeon. In a year or less the cleft will have diminished and the premaxilla will have, in many cases, taken up its place in the arch. Then close the cleft in the palate. No one operative method can be depended on in all cases. Each case must be treated with a full knowledge, on the surgeon's part, of the merits and defects of all the methods advocated. In secondary operations much ingenuity is required in reaching or approximating a satisfactory result. In some of these the problem is indeed hopeless. Especially is this true after failures in the flap turning operations (e. g., Lane's), where the soft palate is destroyed or so cicatrized that nothing further can be attempted.

Langenbeck's method, with modifications, has, in my experience, been applicable to the great majority of cases. In this operation the soft tissues are separated from the bone, brought

down and united along the free edges of the cleft. It is important that the attachment of the soft tissues to the posterior edge of the rudimentary palatine processes be thoroughly cut away in a lateral direction, else the palate will not fall into position. That it in no way injures the soft palate has made this operation deservedly popular for years, and should give it first place in our choice, since when carefully carried through, in the very young, we are justified in hoping for perfect or improved speech. Arbuthnot Lane, modifying Davies-Colley's flap turning operation, gave us the Lane operation. It is a most ingenious and apparently satisfactory method if the closing of the cleft were the only consideration. But knowing that the soft palate is a most important factor in the mechanism of speech, and not simply a partition between the nasal and buccal cavities, we must admit that the Lane operation leaves much to be desired. It restores the form but not the function, and for that reason must always remain a method of second choice. It gives the largest percentage of complete primary closures, and is not difficult of accomplishment to one experienced in this kind of plastic work; yet when it fails it is liable to be an utter and irreparable failure. The palate is so split up by the operation that, if sloughing occurs, it is literally shot to pieces. On the other hand, there is no operation which gives such good prospects of a closed palate after failure in other directions. In one of my cases on which three former operations had been done, I succeeded in getting a very respectable looking palate by the Lane method. In very wide clefts with a flat arch it may be the only operation possible, and should be done in preference to the Langenbeck, since, in such cases, the latter operation involves too much tension and side cutting of the flaps to give a reasonable assurance of success.

It is my object to set down here my experience in ninety-two cases of cleft palate, extending over a period of fifteen years, and to give in detail the technic now employed and to present for trial two new devices employed by me during the past six years.

Of these ninety-two cases only sixty-four are available for statistical purposes. (See appended table.)

To operate immediately after birth, as advocated by some, seems to me a questionable procedure. Those favoring it hold

that normal nursing is established by the closure of the palate and lip. This is true when the patient survives the operation, but the mortality is prohibitive. The feeding of an infant with a complete cleft palate and lip is very often a difficult matter. The child should be carefully weighed before and after nursing, to ascertain if any milk has been taken. Where the weight shows deficient feeding, then spoon feeding, if possible with the mother's milk, should be instituted. In the event of this failing, a small catheter should be passed gently into the mouth of the esophagus and the milk poured in. Many of these children die of starvation from neglect of the above precautions. In from four to eight weeks after birth the lip and premaxilla can be operated on under a very carefully given chloroform anesthesia. One week later, the child may be put on the breast. It is well to encourage nursing from birth, even if no milk is extracted, as the salivary gland secretion is thereby stimulated and the act of nursing is practiced and retained for future use. It also helps to maintain normal lactation.

The age at which the palate should be closed must be determined by the condition of the child. It is quite safe and good practice to operate on some a few months after birth, but in the great majority it should be deferred until the end of the first or beginning of the second year. The mouth, nose and throat must be in healthy condition before any operation is attempted. Diseased or enlarged tonsils should be removed. Too deep an enucleation should, however, be avoided, since the adherence of the anterior and posterior pillars to one another and the cicatricial contraction following, draw the divided soft palate downward and outward, increasing the width of the cleft and making subsequent approximation more difficult. The presence of an enlarged postnasal tonsil, if not diseased, is sometimes an advantage, especially in older children, and in cases where the nasopharynx is abnormally wide and deep. It makes easier the closing off of the nasopharynx during deglutition. This closure is also essential in the proper enunciation of some of the speech sounds. Therefore, this tonsil should not be removed in all cases. In the presence of sinusitis the operation is almost certain to be a complete or partial failure.

Diseased teeth should be removed or filled. Congenital

syphilis in all cases should be excluded before operation. Neglect of this caused two failures in my earlier cases before the blood tests were perfected. Operation should be deferred if coryza or bronchitis are present. The general condition of the child should be carefully looked into, and as high a standard of health secured as is possible before the operation. The question arises: Are congenitally deformed children poorer surgical risks than normal ones? I believe they are. It has occurred to me that there may be some subtle relationship between congenital deformity and the proper balance in the ductless gland system. The only fatality in my series showed status lymphaticus as the cause of death. In several others the shock was all out of proportion to the severity of the operation. In two of these subsequently radiographed there was a strong suspicion of an enlarged thymus.

Operation.—I shall here set down only practical points which have come to me during the fifteen years that I have been interested in this work. In the textbooks may be found the principles of the various operations. It is indeed unfortunate that in these textbooks we find so little of the intimate experience of the authors, and so small a space devoted to detail, on which assuredly the success or failure of the operation depends.

In children between one and two years, feeding should be given within four hours of the operation and should be begun just as soon afterward as food can be retained. A child's resistance ebbs very fast on starvation. In hare lip closures in infants, no feeding should be omitted. The anesthesia, in the latter operation, should be so light that vomiting ought not to occur during or after operation.

Position of Patient, Operator and Assistants.—By far the best position for the operator, both for a good view of the mouth and for his own comfort, is at the head of the patient. He sits on a moderately high stool with his feet resting on a high foot rest, and his knees projecting just above the edge of the head of the table.

The child's head rests between the operator's knees and is partly grasped by them. In this way the head can be moved laterally or dropped deeper between the knees if more extension is required. The two assistants stand on either side of the table and secure a good view of the field of operation.

The anesthetist sits at the side of the table and administers the anesthetic through a junker apparatus, to the end of which is attached a long bent sterilized glass tube.

The Anesthetic.—Chloroform, if not contraindicated, is preferred. Careful anesthesia is of great importance. In long operations a moderate degree of shock may occur, which is much increased by deep anesthesia. In fact, in bungling and slow operating with careless anesthesia, I have seen severe shock and even death occur. I have always believed that the anesthesia, in the majority of surgical operations, may be a more potent cause of death than the operation itself. The anesthesia, therefore, should be light, but not so light as to allow vomiting during the operation. Vomiting over the denuded area is, in my opinion, one of the most potent causes of failure to secure union.

Sponging.—In lieu of sponging I use suction through a small bent glass tube. The suction should not be strong enough to cause injury to the soft delicate tissues of the throat and palate. Strong suction may produce a very detrimental degree of traumatism. Sponges are used to make compression over bleeding points only, and to wipe off the denuded edges of the flaps before tying the stitches. I have seen the whole throat and soft palate covered with a pseudomembrane following rough sponging.

Traumatism.—In no operation is traumatism more productive of fracture than in that of cleft palate. In a dozen ways the friable tissues of the palate may be so injured as to make failure almost certain. During the process of separating the flaps from the bone the edges of the instrument must impinge upon the bone and not on the flaps. The flaps are lifted away, not torn away. The nearer the separation approaches to the gingival margin the more the blood supply to the flap is endangered. Therefore, it is important that the separation in the peripheral direction be carried only as far as is necessary to secure coaptation. It is better to leave the flaps with some attachment to the bone and use longer lateral incisions, than to lift them away as far as the teeth, with the hope that the lateral incision may be avoided. Before the eruption of the teeth the above does not hold true, since then there is a continuous and good blood supply over the gingival ridge. Therefore, in children under one year, the flap separation may

be carried with safety to the level of the apex of this ridge. This is an argument in favor of operating before the eruption of the teeth takes place. Artery clamps should never be used to control hemorrhage except in the rare instance in which the posterior palatine artery cannot be controlled by sponge pressure. Wherever a clamp is used on this tissue there will be a slough later. The flaps should be handled with forceps as little as possible. When the stitches are being inserted a plain forcep may be gently used to hold the edges, but all undue pressure should be avoided. In denuding the edges of the flaps a very sharp thin-bladed knife is used. I prefer an eye knife. The edge is grasped at the junction of the hard and soft palate. The knife then transfixes the tissues just external to the forceps and is slanted from without inward in order to increase the denuded surface. A sawing motion is used, endeavoring to remove the strip in one long, unbroken piece. Enough should be taken to secure a good surface but no more.

Coaptation of Flaps.—Many and strange are the methods of inserting the stitches. I would condemn all needles set on handles (socalled aneurism needles). They all have a flat surface and a cutting edge, and are large and strong enough for a laparotomy. They leave a long, ragged hole. The undue manipulation necessary in their use injures the tissues and wastes time. I prefer very small curved and straight needles with trochar points held in an eye needle holder. Some may argue that such a needle holder is too short. Any unnecessary length makes the accurate placing of the stitches that much more difficult. The needle is inserted near the edge and plunged outward so as to get a deep grasp on the tissues. The reverse movement takes place as the needle is brought back through the opposite flap. Stitches so inserted when tied tend to evert the edges of the flaps and bring a greater raw surface in contact. They should be placed about five to the inch. A very important point is not to tie them too tight, as allowance must be made for reactionary edema. Very fine silkworm gut (ophthalmic gut) and coarse horse hair are perhaps the best suture materials, though I have used Pagenstecher's thread and Lillienthal's silver wire with equally good results. Where time is a consideration the continuous suture may be used, with or without locking each stitch. When this is employed I use one thread for the hard and one for the soft palate. Before each stitch is tied the raw edges should be

wiped with a small sponge wet in saline to remove all blood clot.

Methods of Relieving Tension.—This is perhaps the most difficult problem that confronts us, as is evidenced by the variety of opinions and methods advanced. To relieve tension without unduly limiting the blood supply must be constantly kept in mind. In some of my earlier cases I violated this principle, with the result of seeing some perfect looking palates after operation, fall to pieces in a few days. I believe now that these failures were largely due to placing too much confidence in the lateral tension relieving plates advocated by some surgeons. It is my opinion that the principle of these plates, though perhaps correct in theory, is ineffective and even injurious when applied to this particular operation. We must remember that we are dealing with a tissue not much stronger than thick wet paper. To secure a holding grasp on this tissue with as thin an edge as even the large silver wire used, is impossible. As the plates are applied the direction of the lines of force are not upon the surface of the palate, as supposed, but almost entirely on the stitch holes. If the plate is tilted so as to bring the force more against its surface, then its distal edge impinges against the flap, cuts off the blood supply and causes sloughing. Moreover, its under surface furnishes a fine retainer for septic material, which coupled with the inevitable traumatism already done, opens still wider the avenue to failure.

The advantage secured by preserving the posterior palatine arteries is so great that every effort should be exerted toward this end.

It is, however, frequently impossible to sufficiently lower the flaps without carrying the separation beyond the emergence of these arteries from their foramina. Unfortunately it is just at these points of emergence that the lateral incisions do most good in taking the strain off the weakest point in the line of union (just anterior to the soft palate). Here the flap is so thin that an edge-to-edge approximation is not sufficient to secure union. The edges must be everted so that the upper raw surfaces lie together. To secure this without tension the lateral incision must be carried around the curving edge of the posterior end of the alveolus. I have found that if this incision is made a little internal to this curving edge that some branches of the artery are left uncut and a better

blood supply is probable, or the incision may be made in front and behind the location of the artery. It is well to insert as many stitches as possible before making the lateral incisions. The approximation is done in front and then behind the maximum tension. Then the incisions are made and extended as each stitch is drawn up. Excessive side cutting is thus avoided. It has been observed that the lateral incisions tend to come together and close long before the central line of union is secure. To prevent this, tape has been passed from one incision across to the other and secured, with the object of holding the tissues to the center and preventing lateral closure. The tape is objectionable because it cannot be kept clean. I first tried silver wire, but it cut into the flaps. Then I devised flat-faced small retractors made of silver. (See diagram.) These can be made in any width desired. The arms are about equal in length, the object being to secure a good grasp on the inner edge of the lateral incision. The arm on the palate or buccal side has an eye in its end to which a strong linen thread is secured. The threads of the two retractors are tied and drawn together sufficiently to take all tension off the central line. The retractor can be made for each case by the surgeon from virgin silver plate rigid enough to maintain its shape when bent. It should be of sufficient width to insure it against cutting into the edge of the lateral incision. For cases where lateral incisions are not needed, but where some tension is feared on account of postoperative reaction, I have found very serviceable the single or double hooks shown in the diagram. These have flat faces, sharp points and well curved hook ends, so that they can be plunged through the flap at any desired point and will not pull out of place. The buccal arm of the hook has a small eye for the attachment of a linen thread. This is tied to its fellow of the opposite side sufficiently tight to relieve central tension. I claim for these retractors and hooks facility of application and cleanliness. The flat surface impinging against the soft palatine tissues does not cut its way out as does the silver wire. The amount of tension can be better judged when tying the linen thread than when twisting the stiff silver wire formerly used for the same purpose. Tongue pressure as a factor in producing strain has, so far as I am aware, been overlooked. That it is a potent cause of failure needs no proof when we consider the amount of upward force exerted by the tongue

in each act of swallowing, and that this act takes place every few minutes, more or less unconsciously, and quite independent of the taking of food.

For several years I have been using a device for the relief of this strain, and now feel justified, on account of the good service it has rendered me, in presenting it for trial by others. A plaster cast of the palate is taken, and on this cast is made an obturator which fits accurately along the inner margin of the gingival ridge in infants, and along the bases of the teeth in older children. The obturator is made of platinoid wire, heavy at the rim and light inside. The wires are cross barred and soldered at the points of crossing. (See diagram.) After the completion of the operation the obturator is sewed to the gums in infants and tied to the teeth in older children. Three points of attachment are sufficient—two well back on the sides, and one in front. This is left in until the stitches are removed. It in no way obscures inspection of the wound or interferes with cleanliness. I use it in all cases where the cleft extends beyond the soft palate. It should be made flat or curved slightly upward, and should not project far enough back to impinge against the downward curve of the soft palate.

The After-Treatment.—If in dealing with this I were limited to one statement, I would say: secure rest of the operative field as far as possible.

Of course, absolute rest in this situation is impossible, but the principle should be kept in mind during the whole after-treatment. It is an excellent plan to place the child in a hospital several days prior to operation, under a nurse trained in the care of children, in order that proper control be established. Many children are spoiled in their homes by too much indulgence. We have all observed how angelic those unruly ones become after even a few days under hospital régime. In no operation is control more important, if we wish to secure, after operation, the maximum of local surgical rest. Talking is prohibited in older children. Every effort should be made to prevent crying in younger ones. In these the hands should not be tied, as is sometimes foolishly done. But movements in the direction of the mouth should be limited. The mother should stay with the younger children, and as a rule must receive a course of training as well as the child prior to the operation. If a very young child is insufficiently fed it will cry constantly; therefore, there should be no starvation with

the object of preventing swallowing and the contaminating of the mouth with food. In some children carefully done lavage (inserting the catheter through the nose after a spray of a weak solution of cocain) succeeds very well. When much resistance is met with on the above method, mouth feeding by spoon is best. Milk, oatmeal-jelly, white of egg, milk sugar are the best foods. After feeding, a drink of sterilized water should always be given. Sleep must be secured by opiates or sedatives, if needed. In fact, the more the child sleeps between feedings the better in the forty-eight hours following the operation.

In conclusion, I would say that this operation should be in the hands of men experienced in plastic surgery, men trained in work requiring fine manipulations. Therefore, I turn with hope for betterment in this difficult and discouraging field to the rhinologist and laryngologist of the future.

AGE AT OPERATION.

Under three years	20
Three to six years	18
Six to ten	9
Over ten years	17
Total	64

TABLE OF RESULTS.

Complete failures	7
Partial failures	6
Closed by second operation	12
Closed by third operation	1
Closed spontaneously after partial failure	2
Deaths	1
Closed by first operation	37
Ultimate complete closures	50
Speech normal	17
Speech improved	17
Speech not improved	30
Total	64

In the fifty complete ultimate closures, speech was normal or improved in thirty-four, unimproved in sixteen. In two not old enough to be tested, the prospects are good.

No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
1	2½	Soft palate.	Movable soft palate.	Speech good.
2	10	Hard and soft palate.	Complete closure; some rigidity of palate.	Speech improved (no training).
3	6	Hard and soft palate.	Hole remains at junction of hard and soft palate.	Refused further operation; speech unimproved.
4	5	Soft and one-half hard palate.	Absolute failure, due to low arch.	Child defective.
5	3	Soft and two-thirds hard palate.	Completely closed.	Speech good.
6	2½	Complete hard and soft palate with hare lip.	Completely closed by second operation.	Speech fair, though carefully trained.
7	3	Soft and notch in hard palate; very wide cleft; flat arch.	Complete closure.	Palate tense; speech fair; K sounds defective.
8	4	Complete hard and soft.	Complete closure.	Deafmute; good flexible palate.
9	10	Complete hard and soft.	Complete closure; soft palate short.	Speech bad; extreme type of malocclusion.
10	1½	Complete hard and soft. Double hare lip.	Complete closure.	Speech good; incisors badly turned backwards.
11	9	Hole left by operation elsewhere in center of palate; soft palate fibrous.	Closed hole and palate; no uvula.	Speech but slightly improved.

No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
12	1¼	Complete hard and soft.	Complete closure.	Speech perfect.
13	7	Soft and one-half hard; low arch; wide cleft.	Hole at junction of hard palate; hole closed spontaneously in six months.	Speech but slightly improved on account of tension; no palate, due to fibrous contraction.
14	9	Soft palate only.	Complete closure.	Speech fair.
15	19	Soft and hard palate.	Complete closure after second operation	Speech improved. I gave her personal teaching in clinic for one year.
16	12	Soft and one-half hard palate.	Complete closure.	Speech not improved; mentally defective.
17	2½	Soft and part of hard; rest of palate very thin; no bone.	Complete closure.	Speech good.
18	9	Complete cleft of hard and soft palate.	Small hole left.	Refused further operation; wears obturator; speech unimproved.
19	12	Soft and three-quarters hard palate.	Complete closure after second operation	Speech improved; K and S sounds defective; intelligent; still improving.
20	2	Complete hard and soft, with single hare lip.	Complete closure excepting for very small hole near incisors.	Speech good; some trouble with K sounds.
21	5½	Complete hard and soft palate.	Complete closure with flexible soft palate.	Speech much improved; K and G sounds defective.
22	13	Complete hard and soft.	Lateral hole.	Obturator used; speech slightly improved.

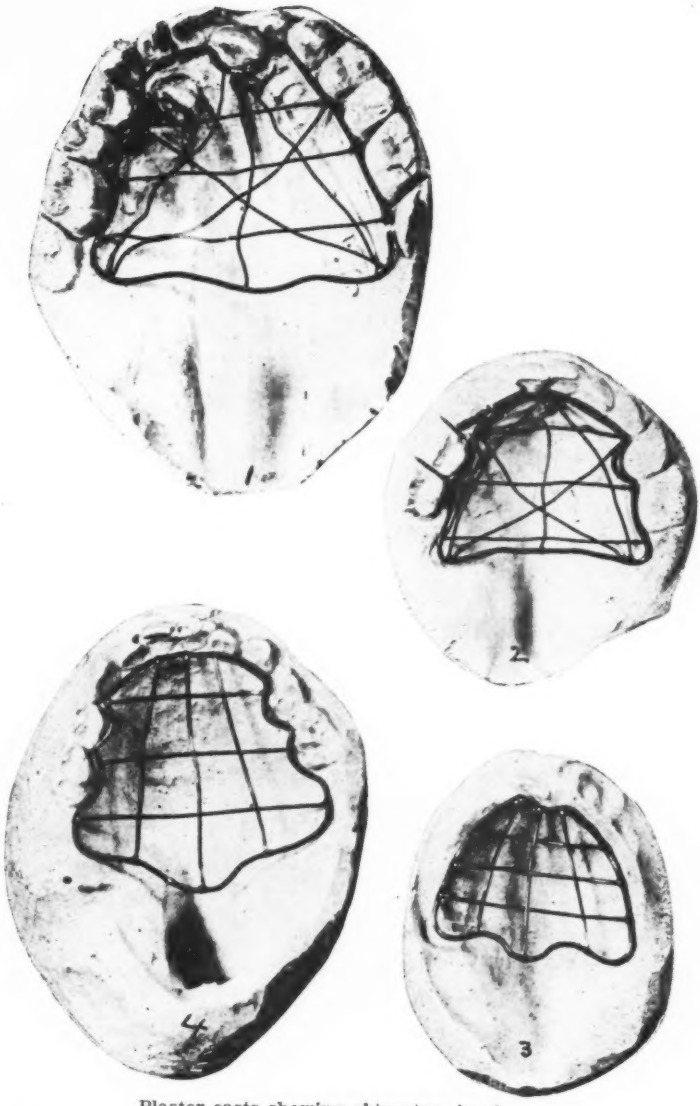
No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
23	9	Complete hard and soft.	Complete failure after two operations.	Child very delicate. Tubercular glands in neck. Father had syphilis. Wassermann negative in child.
24	3	Complete hard and soft palate.	Hole in soft palate closed by second operation.	Speech improved; no training.
25	12	Soft palate only.	Complete closure.	Speech not improved.
26	19	Soft and one-half hard palate.	Soft palate closed.	Chronic sinusitis and discharge precludes further operation; obturator; speech not improved.
27	4	Complete hard and soft palate.	Complete failure; Lane operation done one year later; complete closure.	Speech not improved; child now six and a half years old.
28	14	Wide cleft of soft and one-quarter of hard palate; low arch.	Complete failure.	Cleft was wide. Lane operation should have been done in this case.
29	6 mos.	Complete cleft of hard and soft palate and hare lip.	Complete closure of palate; lip was closed at sixth week.	Speech normal for age.
30	1¼	Soft and one-half hard palate.	Complete closure after second operation; good flexible soft palate.	Speech not quite normal for age.
31	6	Soft palate and part of hard.	Small hole at junction of soft and hard palate closed by second operation.	Speech improved; no training.
32	.1	Complete hard and soft palate with double hare lip.	Complete closure.	Too young to list speech; palate flexible; prospects for speech good.

No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
33	6	Soft palate only.	Complete closure.	Speech not improved; reason not evident.
34	1	Complete soft and hard palate; low arch.	Three holes in palate.	Lane operation done; practically a complete and irreparable failure.
35	5	Soft palate.	Broke down completely on second day; child ran septic temperature for two weeks.	Refused further operation.
36	1½	Soft palate only. Child very fat; large hips and thighs; no hair; blond; florid. Mother forty-two years old; first child	Child died suddenly six hours after operation (lasting one-half hour, chloroform anesthesia).	Enormous thymus found; evidently thymus death.
37	1½	Complete hard and soft palate.	Soft palate broke down after first operation, also anterior part of hard palate. Soft palate united after second operation. Small hole just behind incisor. Closed spontaneously in four months.	Speech satisfactory (by letter).
38	2½	Complete hard and soft palate; two previous operations; great thickening of tissues.	Two operations done elsewhere; first at ten months, second at eighteen months; both failures. Lane operation completely closed palate. Soft palate tense and fibrous.	Speech so far unimproved (four years old). Prospects for good speech poor.
39	17	Oval hole junction of hard and soft palate. Operation elsewhere at three years.	Hole very small after operation; closed two months later.	Speech improved.
40	13	Complete hard and soft palate.	Soft palate only united.	Speech not improved; further operation refused.

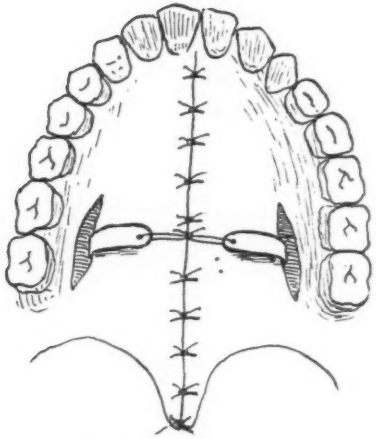
No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
41	11	Soft and half of hard palate.	Complete closure; good soft palate.	Speech slightly improved after considerable training.
42	2½	Soft palate; previous operation by another surgeon, in first year.	Hole remains at junction of hard palate; size large.	Speech fair.
43	9	Soft palate.	Complete closure; good flexible palate.	Speech improved; training poor.
44	4	Soft palate.	Complete closure; palate tense.	Speech slightly improved.
45	5	Soft and two-thirds hard palate.	Good soft palate.	Speech much improved.
46	15	Operation done elsewhere, leaving large central hole. Lane operation done.	Complete closure; soft and hard palate fibrous; no mobility.	Speech not improved.
47	11	Wide cleft soft palate; low arch.	Lane operation; good looking palate.	Speech unimproved after careful training.
48	1	Complete hard and soft palate; hare lip single.	Complete closure.	Speech normal for child of his age (by letter).
49	3	Soft palate, one-half hard; very flat arch.	Lane operation; palate closed; posterior edge of soft palate notched on one side; tissues tense.	Speech bad; child now four and a half years.
50	20	Complete soft and hard palate; high arch.	Closed after second operation.	Unimproved after one and a half years' training.

No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
51	14	Hard and two-thirds soft palate.	Complete closure.	Speech not improved; child mentally defective.
52	6	Complete hard and soft palate; lip closed at second year elsewhere.	Operation by Langenbeck method; complete failure. One year later Lane operation closed cleft and gave a cicatricial soft palate.	Speech not improved one year later.
53	4	Soft palate; slight notch in hard palate.	Complete failure, due to syphilis not recognized before operation.	Refused further treatment.
54	2½	Complete hard and soft palate.	First operation only soft palate closed Second operation left hole behind incisors. Closed by thiru operation.	Severe type of malocclusion. Speech not much improved after one year home (poor training).
55	2½	Soft and one-quarter hard palate.	Small hole at junction of hard palate closed by second operation.	Speech improving; good training.
56	4	Soft and hard palate; previous operation at two years of age; failure by another surgeon.	Lane operation done; complete and hopeless failure.	No further operation possible.
57	1½	Soft palate.	Complete closure; movable palate.	Too young to judge if speech prospects good.
58	18	Hole at junction of hard and soft palate; bifid uvula.	Hole reduced one-third former size. Second operation, flap turning, closed hole	Father states that speech is improved (by letter).

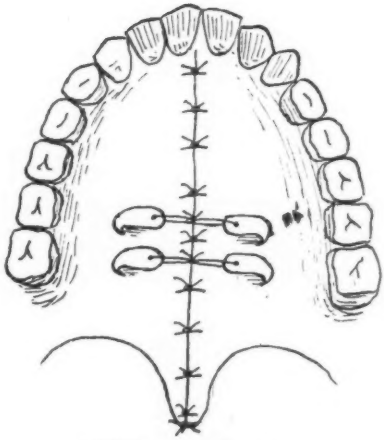
No.	Age	Extent of Deformity.	Ultimate Result of Operation.	Remarks.
59	3½	Soft and one-quarter hard palate.	Complete closure; good soft palate.	Speech seems normal for age.
60	12	Hard palate; soft palate closed elsewhere four years previous.	Lane operation; good closure; soft and hard palate fibrous and tense.	Speech not improved.
61	5	Soft and hard palate.	Complete closure, except in uvula; still bifid.	Speech improving.
62	6½	Soft and hard palate, almost to incisors; V-shaped cleft; low arch.	Complete closure; tissues very thin at junction of hard and soft palate.	There is some liability of this tissue breaking down later; speech much improved.
63	6	Soft and one-third of hard palate.	Complete closure; tense palate.	Speech slightly improved.
64	4½	Soft palate.	Complete closure; soft palate somewhat tense.	Speech not improved to date.



Plaster casts showing obturators in place.



Retention retractors.



Retention single hooks.

XIII.

DISEASES OF THE SALIVARY DUCTS.*

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The ducts of the salivary glands present many points of interest, whether affected by disease or injury, whether acting as highways of infection to the glands or as channels of escape for diseased products originating in the glands themselves; or it may be that the ducts themselves are the seat of the diseased condition, or they may be conjointly affected with the glands. In all of these conditions we have to do with the important tracts that play so marked a rôle in disordered conditions of the salivary system, and where patency is so necessary for the proper discharge of the secretions forming the saliva. It is indeed strange, not that the glands and ducts become affected by the entrance of disease bearing microorganisms, but that there is so seldom infection, and that the variety of infection is so limited, and that really we have but a few diseases either of the ducts or of the glands themselves.

When we call to mind what numerous pathogenic bodies are present in the mouth at all times, and how receptive the buccal cavity is for all sorts and conditions of diseased emanations from the outside world, it is, I repeat, strange indeed that we have such a limited number of diseased conditions of the ducts and glands of the salivary system. It will be best perhaps to take up in detail the troubles arising in connection with Stenson's duct and the parotid gland, and later conclude with the diseased conditions that arise in the ducts of the sublingual and submaxillary glands. Stenson's duct is the name given to the excretory duct of the parotid gland which, beginning as small branches in the gland itself that unite in one common trunk, runs from the anterior border of the gland,

*Candidate's thesis, presented before the American Laryngological Association, 1914.

passing over the masseter muscle, and piercing the buccinator, opens into the buccal cavity on the inner aspect of the cheek opposite the second molar. The walls are quite thick and consist of an outer fibrous coat with contractile fibers, with an inner coat lined with columnar epithelium. Its course[1] is indicated by a line drawn from the lobule of the ear to a point midway between the ala nasi and the margin of the upper lip, and lies above the facial nerve.

The following is fairly good classification of the affections of the duct, which are either primary or secondary: The primary diseases of Stenson's duct are (a) an inflammation, acute or chronic; (b) formation of calculi in the duct; (c) injuries to the duct. The secondary affections are: (a) Occlusions of the duct following acute inflammation; (b) following excessive salivation; (c) impaction of calculi; (d) stricture due to healing of wounds; (e) ulceration of the duct or abscess in the duct due to impacted calculi; (f) stenosis and ulceration due to impaction of foreign bodies; (g) cystic dilatation due to[2] simple inflammation of cicatricial obstruction and suppuration; (h) fistulæ. An acute inflammation of the duct which is strictly primary is due to exposure to cold or extension by continuity of an existing inflammatory condition of the mouth.

The following is a typical case: Mrs. S. G. awakened on the 20th of June, 1891, after exposure to cold and wet the day before on an ocean steamer; she found that she could not open her mouth wide, and that she had a swelling in front of the right ear, and in addition presented the symptoms of an acute cold; her eyelids were swollen and her throat was sore. She came to my office September 25th, and said that even at that time her head and throat were all filled up. She also complained of a feeling of fullness in her right ear, and stated that her mouth was apt to be dry. Examination showed that her ear was normal. There was a large hard swelling of her right parotid, with no special tenderness. There was also a hard cord-like feeling along the course of Stenson's duct. The duct would admit only a small probe and for only a short distance at first, but repeated trials finally were successful, so that the small probe could be introduced the whole length of the duct, and gradually probes of increasing size were passed until the duct was thoroughly and permanently dilated, with the result that the flow of parotid saliva was normally estab-

lished and the gland reduced to its proper size. A calculus may form either in the duct itself or in the parotid gland, or there may be more than one present. This stone is formed of phosphate and carbonate of lime, and although this condition is more common in the ducts of the submaxillary and sublingual ducts, it is not at all uncommon in the ducts of the parotid gland. The color is a dirty yellowish white, and its presence may be felt by palpation or by exploring with a probe passed through the duct to the point of obstruction, or a hypodermic needle may be plunged through the duct wall and the nature of the swelling determined by its feeling of hardness.

These stones in the duct itself form only where the lining[3] of the duct has been roughened or thickened, or a partial or complete stenosis has resulted with an accompanying decomposition of the parotid saliva. Or, as has been stated,[4] a plug of mucus containing some bacteria is retained within the duct and forms a nucleus for the successive deposits of inorganic salts, principally phosphate and carbonate of lime.[5] Sometimes suppuration may occur around these calculi, with the formation of an abscess which may discharge into the mouth or externally forming a fistula. When the stone is in the duct itself the diagnosis is ordinarily simple, but if in the substance of the gland it may be extremely difficult, and in this case a radiogram may be of great assistance. When the calculus is in the duct itself it is easily reached through the mouth, the duct incised, and the stone removed by forceps or manipulation. When, however, the stone is in the substance of the parotid gland the calculus itself should be excised and the wound closed to prevent the formation of a fistula, care being always exercised to avoid the facial nerve, where injury would bring about that distressing and disfiguring condition, facial paralysis. Injuries to Stenson's duct may be due to the traumatism of operation or to accidental injuries resulting in laceration or cutting or contusing of the duct. There may be a complete severance of the duct with the whole substance of the cheek wall, or the wound may be from the outside of the face down to and including the duct, but not the buccal surface. Or the injuries may be from within the mouth and affecting the duct, but not the skin; or there may be a contusion of the parts with laceration of the duct, without either an external or internal wound, in which case there will be a

swelling of the cheek due to the infiltration of saliva into the cellular tissue of the cheek.

One of the earliest mentions of a salivary fistula is by Ambrose Paré, in the sixteenth century, as follows: "Cértait un soldat qui avait reçu un coup d'éprée au travers de la mandible supérieure, la plaie guérit, il ne restait qú un bien petit trou pres de la conjonction de la mandible inférieure a la mandible supérieure non plus grand qú a mettier la teste d'une épingle duquel luy sortait en parlant ou maschant, grand quantité d'eau fort claire et que j'ai souventes fois veue."

There may be a single fistula or there may be multiple fistulæ, the latter when the trouble is in the parotid gland itself, and the discharge of fluid is from the gland itself. I have recently had a striking example of this where an operation for removal of the cervical glands had been performed months before, and during all the time from the operation to the patient's visit to my office the wound had never entirely healed, and there was a continued dribbling of thin discharge which excoriated the neck. The parotid was at the same time enlarged, and it was only after several weeks' treatment that the multiple fistulæ healed and the gland returned to its normal size, this after numerous cauterizings of the fistulæ and a thorough dilatation of Stenson's duct. The treatment of fistula of Stenson's duct differs according to the character and seat of the lesion. When the wound of the duct is from within the cheek, although a fistula ensues, the condition is of practically no importance, the parotid saliva simply escaping through the false passage into the mouth, and the anterior portion of the duct becomes useless and discarded. Should the whole thickness of the cheek be cut through, the outer or cutaneous surface should be carefully sutured and an attempt made to get healing so that the saliva may escape through the internal fistula into the mouth.

Of the duct fistulæ there are two varieties: First, where the fistula communicates with the duct as it lies over the masseter muscle (the masseteric[12]); second, when it lies in front of the anterior border of the masseter muscle (the buccal). When the fistula involves the anterior portion of the duct, the method of Langenbeck and Riberi,[13] which are alike, can be utilized. The part of the duct behind the fistula is exposed and dissected out, and passed into the mouth through a perforation

made in the cheek. When a large portion of the duct is destroyed, or there is a lot of cicatricial tissue, Dejardin and Guilikers[14] perform the operation in this manner. The outer portion of the canal, together with the masseteric prolongation of the parotid gland, is exposed, then the opposed margins of the gland and masseter muscle are separated; after this the inner surface of the masseter is detached from the outer surface of the ascending ramus of the jaw, and the exposed and dissected portion of the gland is thrust between the masseter and the bone through an orifice made in the buccal mucous membrane, to the margins of which it is fixed by a suture. Sometimes a fistula of the duct may be treated by inserting a silver suture inside the cheek, the free ends being about one-eighth of an inch apart, the suture closed and tightened until the included portion of the cheek, sloughing out, forms an artificial opening for escape of saliva into the mouth, at the same time closing the external opening by application of caustics or use of the galvanocautery or by freshening the edges of the fistula and closing with sutures. One of the oldest methods of curing a fistula of Stenson's duct is passing a seton through the whole thickness of the duct and the two ends tied at the angle of the mouth, this moved back and forth frequently until a flow of saliva is established toward the mouth; then the seton is removed and the external wound closed. Whatever method is used, patience and perseverance must be exercised, and every means tried to insure, if possible, a cure of this distressing condition, which may be so bad as to make life miserable for the sufferer. Occlusion of the parotid duct may follow as the result of adhesions subsequent to acute inflammation[6] or violent salivation—this, of course, occurs rarely in these times, as salivation is accidental and not premeditated as in olden days. This condition may also occur after scarlet fever or diphtheria or gangrene of the cheek. The healing of wounds of the cheek may produce a stricture of the duct, or the duct may be blocked up by the impaction of a calculus, or a stenosis may result from the ulceration or abscess due to impacted calculus, or it may be due to the impaction of foreign bodies other than a stone, such as hair[7] in the duct, fish bone,[8] bristle from tooth brush, small bearded tail of a chestnut, etc. Cystic dilatation of the duct may be due to simple inflammation[9] or cicatricial obstruction and sup-

puration, or from the presence of a calculus, causing ulceration and thickening of the walls, or it may occur as an occupational disease, in glass blowers or performers on wind instruments. These tumors are gaseous,[10] the duct becoming infected with the air may be mixed with the saliva and pus. Further, if plugs of mucus[11] or small calculi obstruct the exit of the duct, they may cause an accumulation of fluid which, if it persists, may result in the dilatation of all the ducts emptying into the obstructed one and convert them into an epithelial lined cavity.[15] Running along the floor of the mouth between the teeth and the tongue, parallel to the alveolus, is the sublingual ridge, formed by the sublingual gland. This gland lies on the mylohyoid muscle, with the lower jaw in front. On each side of the frenum on the sublingual ridge is a papilla into which the duct of the submaxillary gland (Wharton's duct) opens. Opening into the same Wharton's duct, or by a separate duct into the same papilla, is the duct of the sublingual gland, called the duct of Rivinus or Bartholini. The superficial portion of the sublingual gland opens on the sublingual ridge to the outer side of the papilla by a number of small ducts, called the ducts of Walther.

A calculus in the submaxillary duct or gland[16] occurs more frequently than does one of the parotid gland or Stenson's duct, and this has been attributed to the presence of mucin in the secretion of the submaxillary gland. When the calculi form in the gland itself they are apt to be very persistent, and the number of stones which may be removed is at times very large, as in one of my cases—a young woman went through a period of about a year, during which many calculi, varying in size, were shed, after the parts became softened, so that incision was demanded, and through the incision a calculus could be removed; in fact, this happened so frequently for months that she semed to be a veritable quarry. After the lapse of time she had no further trouble, nor has she had for about three years.

More frequently the stone forms in the sublingual duct itself, and, as described by Howard,[17] presents four types of clinical features: First, a class of cases in which the patient complains of a hard swelling in the floor of the mouth, but without any subjective symptoms. Then there is a set of cases where the submaxillary is acutely swollen and painful,

and the patient seeks relief shortly after the onset of the symptoms, and in these cases there is sometimes a spontaneous evacuation of the stone. Then, again, occur those cases in which there are recurrent attacks of swelling of the gland, usually during eating, at which time the gland becomes tender and painful, although the patient may have freedom from uncomfortable symptoms for weeks; and lastly, there is the type of cases where suppuration occurs around the stone and an abscess forms which may discharge into the mouth or even externally, forming a fistula.

Frequently a stone imbedded in the submaxillary duct is a source of much irritation; the parts get thickened and tender, and there may be a discharge of pus, appearing at the papilla of Wharton's duct. The breath may be foul, and there may be a marked constitutional effect from the absorption of pus and a fear on the patient's part that he is suffering from a case of malignancy. I have recently had such a case, that had been treated for months. The man had lost flesh, and at the time of his visit to my office he was nervous and anxious about his condition, and fully expected that the tender swelling in the floor of his mouth was a cancer. He had reached a point where it was almost impossible for him to attend to his daily work. Simple incision and removal were all that was necessary; the wound healed quickly and he was back at his work in less than a week, a well man. One woman came to me much exercised over a sore that she had in the floor of her mouth, fully thinking that she had a cancer, and had kept away from doctors for fear of being told that it was malignant. There was a thickening under the tongue, a foul sore covered with a grayish exudation. In this case she had undoubtedly had a calculus in the submaxillary duct which had caused an inflammation of the duct, an abscess had formed, broken, and the stone had come out without her knowledge, and the sore had became infected from her mouth. Excision of this mass resulted in quick healing and a complete cure.

When the stone is situated in the submaxillary gland it may be well to remove the gland, but if in the parotid gland it is the stone that should be excised and not the gland, on account of the facial nerve situated in it. In general it may be stated that salivary calculi are[18] formed by deposits of earthy salts

(chiefly calcium phosphate), from the saliva in the excretory ducts leading from the gland or in the gland itself.

These stones may have nuclei, as, for instance, in Tilnig's[19] case, where a calculus three centimeters in length was taken from Wharton's duct, which had in its center a hair, or as in Dr. Selenkow's case, where the center of the concretion was masses of leptothrix. Foreign bodies may get into the duct, as in the case of a boy, sixteen years of age, who thought he had got a piece of oats stuck in his tongue, in July, 1910. The submaxillary gland was enlarged and there was a hard swelling along the course of the submaxillary duct, and in March, 1911, a piece of straw came out spontaneously, the symptom entirely disappearing. Another case was one where there was a swelling of the submaxillary gland, which was increased on taking acids. Removal of a stone from Wharton's duct relieved the symptoms.

Of the various affections of the salivary apparatus, a not uncommon one is the disease known as ranula. This, according to one definition, is a "fluctuating semitransparent tumor under the tongue, resulting from accumulated saliva and mucus in the ducts of the sublingual gland, or from the independent development of a cyst in the sublingual region." This somewhat indefinite statement as to the pathology of this condition is in keeping with the two schools of opinion as to the seat of the affection.

Davis[20] says that a ranula is a name given to a cyst occurring in connection with the salivary glands, the sublingual or submaxillary, and when the duct of either is obstructed, as by a calculus, it will form a cyst which would bulge into the mouth beneath the tongue and be called a ranula. The sublingual gland is usually the starting point of these cysts, and will be seen that as they enlarge they push the ranine artery, with the tongue backward, and are only covered with mucous membrane.

Butlin[21] states that a ranula is a dilatation of acini or ducts of mucous glands beneath the tongue and not a dilatation or Wharton's duct, and worked out by von Recklinghausen and Sommenberg in this manner. They claim that the gland which is diseased is the Blandin-Nuhn gland, a small mucous gland situated on the under surface of the tongue, a little to one

side of the middle line, and the cyst is formed by the dilatation of one or more of the acini of this gland.

That any smooth tumor under the tongue anteriorly is apt to be loosely diagnosed a ranula is well illustrated by a description of ranula by Dorsey,[22] 1823: "This consists of a tumor under the tongue containing a glairy fluid resembling the white of an egg. It is supposed to proceed from an obstruction in the salivary duct. The tumor sometimes contains, instead of the viscid fluid that has been mentioned, a purulent matter, and sometimes a calcareous concretion."

In this description he does not separate a true ranula, which is a dilatation of one or more of the acini of the Blandin-Nuhn gland, and a dilatation of Wharton's duct or of Rivinus or Bartholini duct. If the swelling is a true ranula, passing a probe into Wharton's duct will go, not through the swelling, but beneath it, and the swelling will not be diminished in size. Really the only conditions that might be confounded with a ranula are either nevus or a dermoid cyst. A nevus is not fluctuating, and the blood is easily pressed out of the swelling, and the swelling is opaque. The dermoid cyst is doughy in feeling, and there is a lack of translucency, and forms a hard swelling behind the jaw bone. Usually with a ranula there is absence of discomfort unless the swelling is of considerable size, while with a dermoid cyst there is discomfort in speaking or eating, with a constant feeling of fullness in the mouth; it is yellowish in color, there is a swelling behind the chin rather than under the tongue, and has the usual contents of a dermoid cyst, cholesterin, epithelial cells, fatty débris, rarely hair and with extreme rarity bone and teeth.

In the study of diseases and pathologic conditions of the salivary ducts one can but be impressed with the extreme rarity of malignant affections of these structures, and with the readiness with which most of the untoward conditions can be remedied, although each case must be dealt with according to its requirements, and not according to any general rule. Yet many of these cases must be cured only after a prolonged course of treatment before relief can be obtained, and I am sure no class of cases will give more satisfaction, both to surgeon and patient, than these same salivary affections, and especially in the cure of external salivary fistulæ.

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XIV.

NOTE CONCERNING AN ARTIFICIAL EAR.

By Samuel Horton Brown, M. D.,

Philadelphia.

Several years ago, while engaged in the examination of an applicant for life insurance, in the course of the routine questions regarding the presence of deformities, etc., I asked an apparently normal man in a more or less joking manner if he had any glass eyes, wooden legs, or anything of the sort, and he quickly answered me that he had not, but that he was wearing something entirely artificial and that he was taking no pains to conceal it, but rather was anxious that it would be seen. This curious answer to my questions was rather disconcerting, and an endeavor was made to determine just what this condition of affairs was. The place in which the examination was made was rather dark, and it remained for the man to show me the condition, which he did by removing one of his ears. This was a most remarkable state of affairs, and a close inspection was then made of the man's ear. He had absolutely no external ear except the canal; the auricle was entirely gone. When a boy he had been dragged on the side of his face and head in the snow for a long period after having fallen from a sled or sleigh, with the result that this particular ear that was injured was torn off and the remnant of it sloughed off. When he was old enough to wear an artificial ear with safety, he had a series of them made of papier mache and colored by an artist to match the good ear of the other side. He then proceeded to show me his collection of ears, Sunday ones as well as weekday ears. He held them in place by the simple expedient of pasting them on with mucilage. From a cosmetic standpoint they left little to be desired, and I have no doubt served to gather the sound waves as well as the natural ear. What effect such a condition would have on mortality statistics is a question, for it is a certainty that any condition not encountered by the actuaries in their figuring is assumed not to exist. Therefore, this note is made that it may be of record that a healthy adult man has been observed with an artificial external ear without any disease of the other parts of the ear.

XV.

HARMLESS POSTOPERATIVE TEMPERATURE.

By Geo. F. Cott, M. D.,

Buffalo.

The danger of chronic suppuration of the middle ear is evident to all. We often have typical lesions, while at other times they are altogether out of proportion to the symptoms. A brain abscess may be latent for an indefinite time without any symptoms whatever, but usually there is some indication of hidden trouble. Occasionally multiple abscesses occur when but one is suspected. Pachymeningitis is frequently found, without manifesting any symptoms, and even epidural abscess is occasionally discovered during operation. These cases may be exceptional, but they occur with sufficient frequency to justify careful consideration of the subject.

In pachymeningitis with pus we expect pressure pain with perhaps intermittent discharge; the pains may be severe, mild or absent altogether. In leptomeningitis we have irregular temperature, stiffness of the neck muscles, Babinsky, tache cerebral, Kernig's sign and other nervous signs, which may be augmented by examination of the spinal fluid. Brain abscess usually gives us a slow pulse, dull pain, low temperature, slow mentality, sleepiness or somnolence. If the abscess is located in the cerebellum, in addition there is usually nystagmus towards the side of the disease; dizziness and occasional vomiting also occur. In phlebitis, especially of the lateral sinus, which is most affected in ear cases, there is commonly the steeple-peaked temperature of slow or rapid repetitions, according to the virulence of the infection. In septic thrombosis the symptoms include violent chills and sweats, depression from sepsis and a high leucocytosis. In suppuration of the internal ear, dizziness, nystagmus, often vomiting and deafness, following caries of the middle ear.

The case becomes more complicated when several of these lesions occur together, and of course disaster is more apt to follow. Yet nature is very kind to some patients. I have seen a man walk from his bed to the operating room where a radical mastoid was done, manifesting no special symptoms but enough pain to cause him to consult his physician. On his death the second day after, we found one entire hemisphere covered with pus which trickled on the floor as the upper calvarium was removed. He was an old syphilitic. In another case a lady walked into the office with pus discharging into the external auditory canal from a brain abscess. A third was sitting in a chair, temperature 104°, some pain deep in the ear, but refused at first to go to a hospital, not feeling particularly sick. At the operation on the same day we found a circumscribed epidural abscess, a thrombus in lateral sinus which had broken down and formed pus in the sinus.

These are unusual cases, but they may occur at any time; and they should always be suspected and never passed over lightly when caries of the tympanum is present. Unless one sees a number of such cases with brain complications, he is apt to overlook some common symptom and the patient may succumb; on the other hand, some real prominent symptom may mean very little, but may impress the physician greatly and cause unnecessary worry. The surgeon is often called to operate out of town, not knowing much of the patient's history and acting only on present indications, then not seeing the patient again. Bad results occasionally follow the operation because too little was done; still the patient may have passed away if the exact condition had been ascertained. However, a doctor's conscience is more at ease when he is fairly sure of the status of the patient. If these patients can be observed a few days before and after the operation, one may be able to render better satisfaction. Often operations become necessary when the physician makes his first visit; it is unfortunate, but sometimes circumstances may require immediate action.

One important item must not be overlooked. It is not at all uncommon for patients to deny any former ear trouble. Brain affection due to the ear is at once dismissed, and an opportunity is thus lost to save life. A number of such cases upon examination were found with scars on the drumhead, or

old perforations, leaving a good field for developing bacteria. In all suspicious cases the ears ought to be examined before they are dismissed as a factor in meningeal or brain infection.

I would like to call your attention to a procedure of importance which any man may carry out and which will always give him fairly accurate information, and that is the examination of the blood. If there is a moderately high leucocytosis with a normal polynuclear percentage, followed in ten or twelve hours by a mild recession the next day and the following day the same, you may be quite sure the patient has no complication and will speedily recover; if this condition is reversed, there are breakers ahead; and this shows twenty-four to thirty-six hours before any other symptoms are noticed. If, for instance, the patient runs a receding temperature of 106° or more, and the leucocytosis is normal, there is nothing to fear from infection. On the other hand, if the temperature is normal or below and leucocytosis is high—say 20,000 or 25,000—there is something brewing, and rapidly, too.

There are four conditions where the temperature could be below normal in serious cases: brain abscess, sinus thrombosis, shock, and approaching dissolution. If the temperature is taken every hour and a blood count made twice a day where any complications are suspected, one can act far more intelligently than where these things are omitted. Especially is this true with septic sinus phlebitis. You may find the temperature 106° or below normal at your daily visit, whereas, if the temperature had been taken frequently, it would have been found that both extremes occurred on the same day; at any rate, the blood count would have disclosed the approaching danger. Suppose that several weeks after an operation or after an acute attack of some kind, perhaps an apparent simple sore throat, a patient gets a sudden high temperature preceded by a chill, sometimes of considerable severity, lasting for several minutes, and these chills agitate the patient so violently that the bed trembles, the temperature rising thereafter and at times receding in a few hours, at other times remaining stationary a few hours, then declining slowly, and that process may be repeated at intervals of a few days to a week or more; pain may be present in some distant part of the body, and apparently no connection with the lesion in the throat or ear, yet there is undoubtedly infection localized

somewhere, remote from the original disease. This is peculiarly the case with embolic infection. The immediate effect is a rise in temperature for a short time only. The leucocytosis may be disturbed and run to a height of 20,000, polynuclear percentage nearly up to the limit. In one case it was found to be ninety-eight per cent, more often it is not over ninety per cent. Such patients may have considerable pain, or the temperature rises, but, however, gradually subsides until another spot becomes infected. These areas of infection take place anywhere—liver, spleen, brain, lungs, joints, etc.

Endocarditis is a common cause for such abnormal temperature, and this condition is not always easily made out. I believe it is oftener found after operations. However, the rule is that these patients usually recover. When this condition occurs early after an operation, or some septic disease, and the patient does not improve rapidly, the streptococcus or diplococcus capsulatus is the probable cause and the patient succumbs. The blood count will usually indicate the severity of the infection. These patients can often be saved if the diagnosis is made early. They usually recover when a distant vein is affected. The same condition exists in endocarditis. Unless the infection is carried to some other part of the body, no special difference is noticed in the temperature; but should an embolus affect any other organ, the temperature shoots up three or four to six and eight degrees. But if the patient ultimately recovers, the temperature recedes rapidly and the constitutional effect is not marked at all.

The temperature in each one of my cases was postoperative, but it occurs in any kind of infection except where there is much shock. We notice the high and low temperature in septic sinus thrombosis, but we do not know about the thrombus until this peculiar temperature occurs, so a patient is liable to succumb before a diagnosis can be made. Marasmic thrombus usually causes no such temperature, nor does a thrombus anywhere in the body where it is thoroughly organized.

A similar condition of affairs exists in infection following tonsillitis, arthritis (commonly called rheumatism), pneumonia, periostitis and bone necrosis or abscess, remote from the throat lesion. But the infection, seldom traced to the throat, since it comes on several weeks after the throat has apparently recovered, is, nevertheless, due to the lymphatic absorption

and final distribution to remote distances. This explains many affections hitherto treated as idiopathic diseases. Furthermore, where lymphatics are abundantly distributed, the presence of infection, even though mild, is rapidly manifested. This is true in sinus disease, which may cause rapid rise in temperature and a lymphangitis of the brain with very severe pain. But a more palpable illustration is found in septic deposits, as in the heart or sinuses, or even after abdominal operations. The sinuses of the brain give splendid opportunity for demonstration.

When a septic thrombus forms, there are no other symptoms than those commonly found in any other infection; but where a particle is carried into the circulation, there will be a sudden rise in temperature commensurate with the degree of infection; and every time such embolus has made its call in a remote part of the body, we get a repetition of the high temperature. As these points of hesitation are small, the temperature remains high but a short time and commonly recedes in a few hours to recur again and again. It is one way nature has of letting us know the condition of the patient, and many lives have been saved because of recognition of this symptom.

The peculiar temperature shown in the charts are all due to chemical or organic emboli, and all recovered as predicted, for the prognosis is always good when the constitutional symptoms are mild, regardless of the high temperature.

The chart No. V is so arranged by Kopetzky that when the polynuclear percentage is less than the total leucocytes, the line runs downward. This indicates good resistance and good prognosis. If the opposite occurs, look out for trouble. The blood counts should be made every ten hours, or at least twice a day.

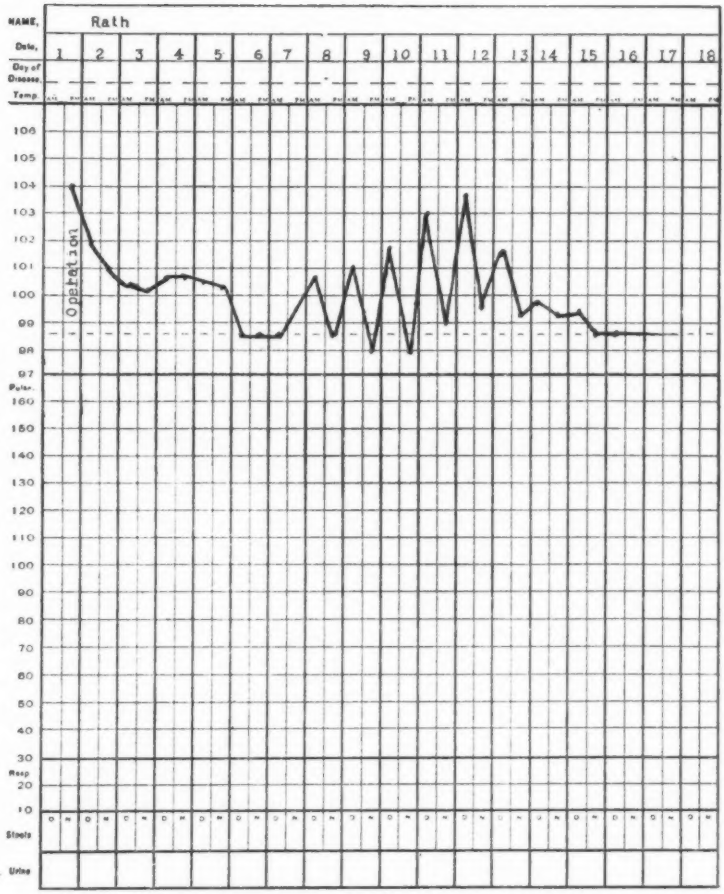


Chart I, Case 1. Radical Mastoid Operation.

Sinus thrombosis, which had broken down and formed pus in center; epidural abscess. After operation temperature fell to normal; after the seventh day temperature rose and continued to rise and fall for a week, then gradually recovered. At the height of the fever, which reached 104.5°, the consulting surgeon said the patient would die, with which I disagreed. Recovered.

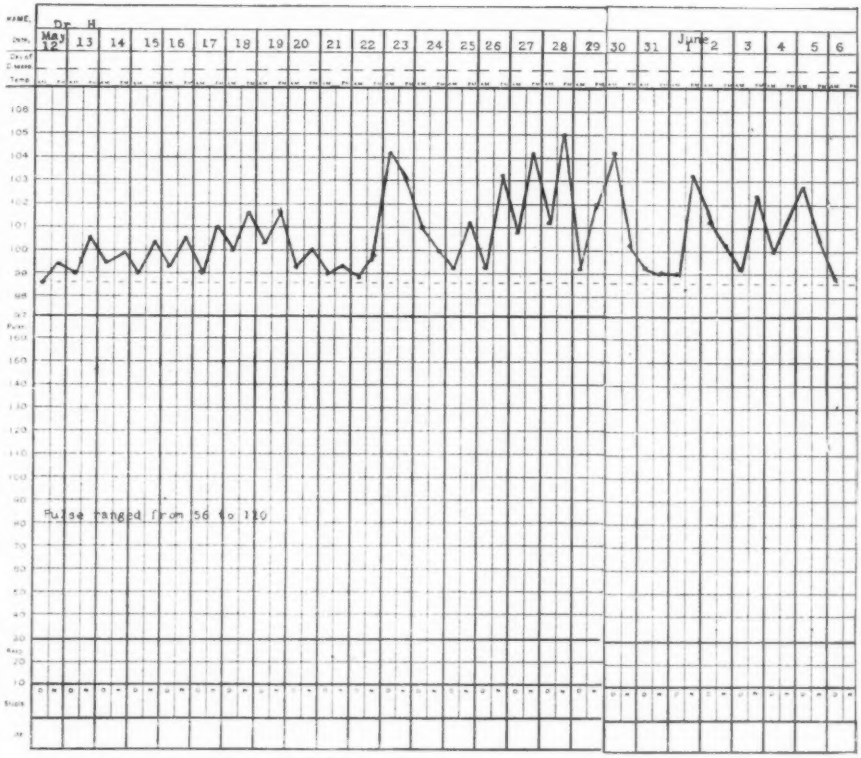


Chart II. Case 2. Radical Mastoid Operation.

Caries. Fifth day after operation, temperature rose and continued to rise and fall for a week. At the end of that time, in consultation with two eminent men, an internist and a surgeon, it was decided to explore the lateral sinus. But the next day the temperature returned to normal and I put off operation. Final recovery.

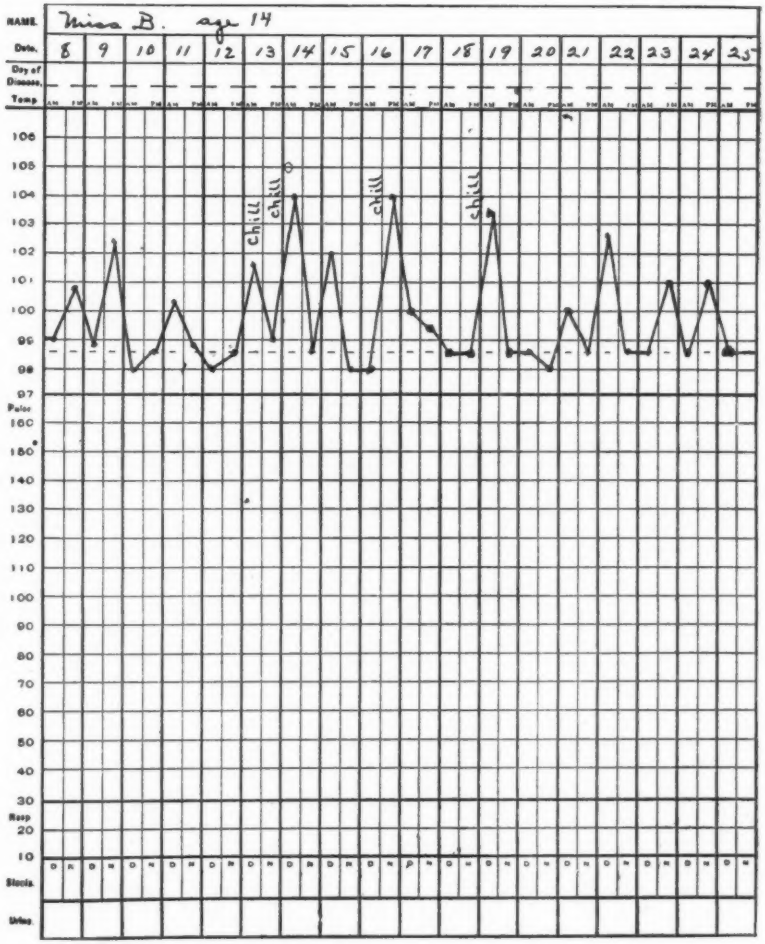


Chart III, Case 3. Mastoid Disease.

The peculiar temperature caused an examination by her physician and a surgeon, and they concluded she had endocarditis. The only murmur heard was over the left scapula towards the vertebræ. Recovery.

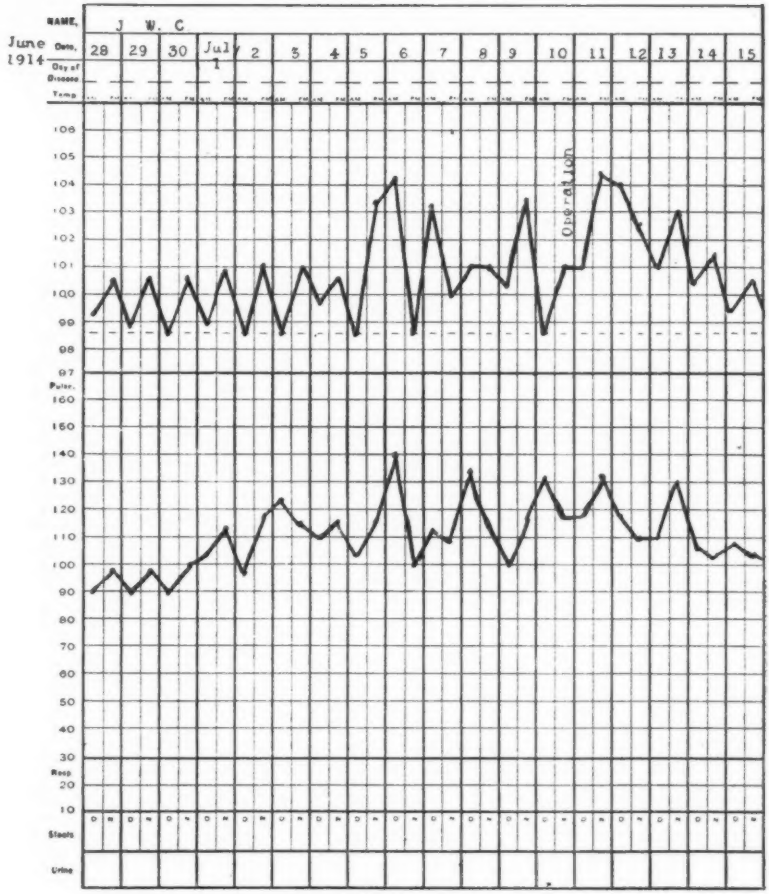


Chart IV, Case 4. Radical Mastoid Operation.

Patient thought to have typhoid fever; after two weeks drum head ruptured and discharged pus for about ten days, when I saw him. His trouble was supposed to be acute mastoiditis. Found sclerosis due to recurrent attacks; mother denied previous ear disease, but acknowledged boy had complained of earache off and on. Red cells, 4,250,000; white cells, 10,000. Lingered for several weeks after he left hospital, then recovered.

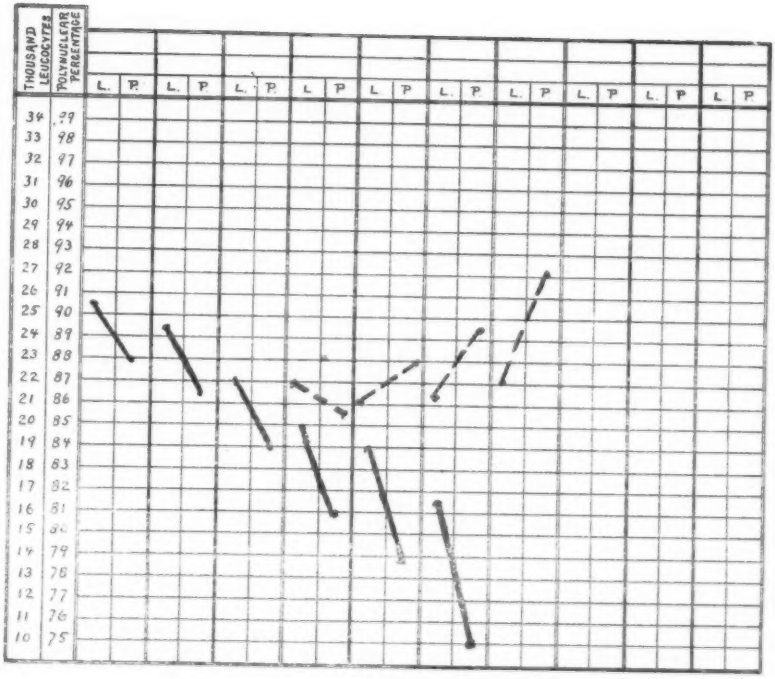


Chart V.

Arranged by Dr. Samuel J. Kopetzky.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of October 9, 1914.

Paper: Specific Nerve Deafness; Treatment With Salvarsan and Pilocarpin.

By James Garfield Dwyer, M. D.,

New York City.

(No discussion.)

Paper: Systemic Infection of Middle Ear Origin in the Exanthemata.*

By Charles R. C. Borden, M. D.,

Boston.

(By Invitation.)

DISCUSSION.

Dr. James A. Babbitt, of Philadelphia (by invitation): This paper just presented by Dr. Borden was replete with interesting information, and I wish personally to very much thank him for his courtesy in presenting it to us. My acceptance of this opportunity of discussing the paper was not on account of any superior knowledge which I may have on the subject, although I have become much interested in it on account of my connection with an institute near Philadelphia, but because of the pleasure of meeting with you gentlemen again and of hearing this presentation which has been given to us.

It has told several new points of interest in a subject which has been more or less investigated and demonstrated before. The three exanthematous types of the paper—measles, scarlet

*See page 1.

fever, and diphtheria—present in a certain measure analogous types of acute and rapid infectious diseases, perhaps emphasizing in scarlet fever the persistent infective sequence; in diphtheria, the profound and rapid toxemia; and in measles, the persistent after-depression.

I found quite a record of statistical investigation on the relation of these to otitis media—representing numerically from five to fifteen per cent of association between the two—and the specialized statistical report in relation to deaf-mutism. The more common complications of this exanthematous type are otitis, albuminuria, endocarditis, and, closely following in frequency, arthritic involvements and pneumonia.

The middle ear disease becomes a cause of low resistance, depending upon the organism, streptococcus, staphylococcus, pneumococcus, etc.

Bezold emphasizes the absence of all ordinary symptoms of ear trouble save deafness as being a common characteristic. Personally, I would not fear the use of anesthesia, which could be used in very minor quantity and in conjunction with topical iodin or carbolic application.

Widespread knowledge and acquaintance with paracentesis has, in my judgment, rendered the percentage of otitic cases far less in later years. Fatal otitic cases are on frequent record, and I recall two which were associated with marvelously widespread infection, in which the streptococcus was even found present in the urine, and subsequently found by autopsy in almost every cavity of the body. Diagnosis of this complication is facilitated by peculiar toxic evidence in the patient.

Unfortunately we do not know just where an aural complication to scarlet fever and measles may lead us. It has not been my experience to have much complication follow diphtheria. I would like to record a very recent case in which mastoidectomy subsequent to measles became necessary, in which the surgical operation was followed ten hours later by a temperature of 106°, and two days later, in the night, with a cardiac collapse which was nearly fatal, but the patient subsequently recovered.

It was my pleasure in accepting this discussion partly to gain some light upon this otitic element, namely, that connected with the suppurative discharge as a carrier of infec-

tion. I have read the record before me of a case in my charge in one of the deaf and dumb institutes near Philadelphia, in which in February and March, 1914, nine children and two adults were sent to the municipal hospital with scarlet fever. I quote the words of the head nurse in a letter sent me: "In February and March, 1914, we had nine children and two adults; all went to the hospital, one child dying after being in the hospital three days. We tried in vain to find out if the first cases had been exposed to the disease, but could not. A doctor from the Board of Health thought that it might have come from a child who in May, 1913, had become deaf from scarlet fever, and had an ear discharge after coming to us in December, 1913, from Erie. Just previous to the outbreak this boy had had some discharge from the nostrils, while the ear discharge had almost disappeared. The Board of Health thought he might be the cause and sent him to the hospital, where he was for two weeks."

I should be very glad to have Dr. Butt and Dr. Borden allude to that element of the carrying possibilities, especially the interval, as it would be a great help to some of us, I am sure. We are being rapidly educated to the necessity of prompt and sometimes rapid surgical measures in connection with the ear.

I want to add my thanks again for Dr. Borden's paper, which is a help in convincing me on certain points about which I was delaying decision. It has been a great pleasure to discuss the paper.

Dr. D. Bryson Delavan expressed his indebtedness to Dr. Borden for the admirable paper on a subject more or less familiar, but presented with so much force and clearness. In Dr. Delavan's own opinion, the facts which the reader of the paper had particularly emphasized, namely, the dangers of the nonrecognition of the aural complications in the exanthemata, and of delay in meeting them when present, have had very serious consequences. Of course, their seriousness with regard to risk of life is at once recognized, but there are many examples where, though life was not sacrificed, the hearing had been permanently destroyed in one ear or both, from one of the attacks to which the essayist had referred.

Even with no greater risk than that of loss of hearing, the operative procedures which are called for in such cases cer-

tainly ought to be employed. Dr. Delavan said that it was hard to understand why operation should be delayed where the risk was so great. Such delay was generally due to the lack of education on the part of the public as to the importance of operation. If surgeons were given full permission to treat these cases as might be required, doubtless more lives could be saved.

With regard to the use of anesthetics in these cases, as Dr. Babbitt had just said, there seemed to be no reason why anesthesia should be withheld when the necessity for operation was so urgent.

Dr. Charles G. Kerley said that in discussions by specialists, the general practitioner usually came in for more or less condemnation. He was sure that the reason why the practitioners failed to recognize acute ear disease in children was because of their faulty teaching by the aurist. The teaching is that in an acute otitis in children there are evidences of pain, such as head rolling, ear tugging, ear boring, crying, etc. In infants, pain is an unusual manifestation of an acute process in the middle ear. In his own cases seventy per cent failed to show signs of pain.

Aural complications in diphtheria are infrequent. Scarlet fever and measles have a definite fever cycle of five or six days. When the temperature in these diseases continues after the usual temperature period, it is very possible that the ears may be involved. During scarlet fever and measles the ear should be under daily observation, the same as the heart and lungs, and then when trouble arises it will occasion no surprise. Every physician who treats measles, scarlet fever and influenza should be familiar with the appearance of a normal ear drum, and then he will be able to determine when disease attacks the parts.

Athreptic infants very frequently suffer from acute otitis without even the symptom of fever, the only manifestation being progressive loss in weight and general poorness.

Dr. Kerrison said that in cases of the acute infectious exanthemata the serious influence of a severe middle ear and mastoid infection in depressing still further patient's resistance and vitality was generally recognized. The conclusion that all such cases should be subjected to a mastoid operation was not, however, justified. There were some cases in which the

need of prompt operation was urgent and unquestionable. There were others in which, in spite of clear indication of mastoid involvement, it was safer to delay operation until the patient had recovered from the systemic infection. Such delay was justifiable and wise in many cases in which a large perforation allowed free drainage, and the symptoms of septic absorption from the ear were not present. The question of operation should be determined only after careful consideration of all the symptoms present in each individual case.

Dr. Kerrison said that he did not believe any dogmatic rules or conclusions as to the indications for any operation during the course of the infectious diseases could be safely made.

Dr. Matthias Nicoll, Jr., said that he wished to make a few remarks, based on a long experience in treating infectious diseases. With regard to noma, Dr. Borden had said that it only occurred after measles. He himself had seen eleven cases in the scarlet fever service.

Dr. Borden had spoken of the advisability of operating in the course of acute septic scarlet fever, even when there were no marked symptoms of mastoid disease, on the principle that this might be present. Dr. Nicoll said that such action did not appeal to him at all. He would hardly expect that a general sepsis, as shown by blood culture, together with myocarditis, arthritis, and nephritis, would be improved by the removal of a drop or two of pus from the mastoid cells. The shock of such an operation was too great to justify any theoretically good results which might follow.

With regard to ice coils, of which Dr. Borden did not approve, he did not know what was the consensus of opinion of aurists, but he had seen cases with every symptom of mastoid disease, in the course of scarlet fever, which had recovered very promptly without operation, apparently as a result of this treatment. As to the use of antistreptococcus serum in severe cases of scarlet fever, while the results had been by no means uniform, in his experience the use of it in large doses had been the means of saving a number of patients whose condition was apparently hopeless.

Dr. Nicoll said that there was little or no cooperation in contagious disease services between the regular attending physicians and the visiting aurists in making systematic study as to the prevention of infection of the middle ear and mas-

toid, especially in scarlet fever cases. As a rule, the resident staff performs paracentesis when necessary, and if the aural discharge persists, or there is evidence of mastoid involvement, the case is turned over to the care of the aurist, to be operated on or not, according to his judgment. Again, in the treatment of nasopharyngeal diphtheria, it had been the custom, for many years, at the Willard Parker Hospital, to irrigate the nasopharynx with large quantities of warm normal saline under low pressure, the child being closely confined in a sheet pinned about the body. He ventured to say that there was hardly any one present who would approve of this procedure, for the theoretic reason that it would result in the forcing of infectious material into the eustachian tubes and thus set up disease of the middle ear. As a matter of fact this did not occur, in proof of which he called attention to the fact that otitis media rarely occurred in the diphtheria service, and mastoid operations were practically unknown. On the other hand, the nasal irrigations had proven to be of the greatest value in clearing up the local condition.

In deference to otologists, such irrigations had not been practiced on the scarlet fever service, and yet when one considered with what uniformity ear disease follows certain types of scarlet fever, it would seem that nasal irrigations could at least do no harm and might conceivably be of benefit as a preventive measure.

Dr. Nicoll said that he did not believe it was possible, with the present state of our knowledge, to lay down a rule as to how long after the occurrence of scarlet fever, discharges from the nose, throat, middle ear, and mastoid operation wounds were capable of causing scarlet fever in others. As long as such discharges were present the patients should be regarded as a menace to susceptible persons with whom they came in contact.

Dr. Kenefick said that the subject had been treated so completely by Dr. Borden and by those who had discussed it, that little remained to be said. The last speaker had struck a most important point—the prevention of these conditions. He had said, however, that the otologists do nothing to prevent otitis in the infectious diseases. On the contrary, Dr. Kenefick said, the otologists are all the time urging upon the pediatrists, the general practitioners, surgeons, and every one concerned, the

great importance of having the nasopharynges of all children put in proper shape, under at least three years of age, thus greatly lessening the chances of infection, and, above all, permanently establishing the proper physiologic function of the eustachian tube. His experience of ten years at the New York Foundling Hospital had demonstrated to him the importance of these measures.

Dr. Eagleton said that in the city of Newark all the contagious diseases come to the City Hospital. One of the earlier speakers had stated that there was no cooperation between the otologists and the attending physicians. In the beginning of his service at the City Hospital, the otologist was accustomed to go there one afternoon each week, and it was his duty to examine the ears of all his patients—some of them every day—of his service. At that time it was customary to discharge a large number of patients after scarlet fever with the loss of hearing of one ear. Gradually, however, the importance of early attention in these cases was recognized, and a very thorough routine was established, which is continued today. When the patient is admitted the ears are examined, and if they are found to contain detritus and the drum is a little red, and this continues for a second and a third day —then, without waiting any further for any bulging or pain, a paracentesis is made. This is generally followed by a very profuse serous discharge for a few days, and that is all there is to it. Under this line of treatment, there have been no mastoids and no chronic running ears.

Dr. Borden had spoken of operation for acute sepsis, and the importance of this should be emphasized. In operating for acute sepsis from scarlet fever, the following day the wound is frequently found to be covered with a thin diphtheritic membrane, and on the third day there is a discharge from the wound; but if they are operated early they invariably do well. It is, therefore, well to operate early in cases of acute sepsis, and not to wait for it to subside. As shown in the albuminuria caused by the otitis, it is found that a large number of these cases have nephritis; but it does not add at all to the danger of the operation.

In regard to the carrying of infection, Dr. Eagleton told of a boy named Willie K., who had spent almost his whole life between the babies' wards and the ear infirmary. When he

was a small child he contracted diphtheria and had a running ear. He was operated upon, but the discharge still continued, and he was taken to the Babies' Hospital. He has been operated upon twice, and has come back to the ward three times with chronic diphtheria. He has been going back and forth from one of these institutions to another for at least four years, with a positive culture in a discharging ear.

Dr. Wilson said that the members of the section were indebted to Dr. Borden for coming before them and again insisting upon the necessity for an early operation in these mastoid cases in scarlet fever, especially those complicated with joint disease, nephritis, etc. Dr. Delavan had spoken of the public not being educated in regard to this. The public never will be educated to it until the otologists themselves are educated to it. Many have been loth to operate early in these cases, fearing the effects of the administration of ether, shock, etc. Dr. Wilson said that he himself, after hearing Dr. Borden's paper a year or two ago, had made up his mind that he would operate early in these cases, and he has seen no occasion since to change his mind.

Dr. Borden, closing the discussion, said that as he had read three papers on various phases of this subject, he had been compelled to try to make it somewhat different, and had purposely left out reference to preventive measures, but as the discussion had gone that way, he would like to add a few words. Several years ago he had read a paper based on four hundred and fifty autopsies. His attention had been directed to them by one of the younger pathologists in the Boston City Hospital. He had gone over all of these cases, and the majority of them had middle ear and mastoid conditions. Of these four hundred and fifty cases the mastoid was studied in about two hundred and fifty instances; eighty-four were diphtheria cases; ninety, scarlet fever cases, and one hundred were measles cases. All had pus in the middle ear or mastoid. That is about the ratio in which they occur in most clinical cases. Very few statistics have been given in diphtheria. In his own cases, they occurred in a little less than four per cent. There is a great difference in clinical cases; between four, twelve, and twenty per cent. A curious point in regard to these cases is that when we consider the mastoid, the order

is reversed. Thirty cases of diphtheria showed mastoid conditions. Most of his papers had been based on the statistics from these autopsies.

As to the importance of radical operations, there was but one more thing he wished to say. Dr. Leland had stated that for the first nine years of his service in the contagious department of the Boston City Hospital he had operated on every mastoid in every one of these diseases, regardless of the condition of the patient, and had never had a death in all that time. At the end of the nine years there was one death from lateral sinus thrombosis. Dr. Borden said it was about that time that he himself came to the hospital, and he had never had but one death, and that occurred in measles from pneumonia, a week after the operation. It was not at all certain that the operation had anything to do with it.

Dr. Borden said that he had been considerably criticized in regard to the position he had taken in regard to operating on these cases, but he did not know of any institution that could show better records—most of them in Boston and others in Brookline.

On almost every occasion where he had read a paper before specialists there has been rather bitter discussion—the question of aural infection, and the question of irrigation, sprays, and all manner of cleansing operations had been presented. Replying to what had been said in the present discussion, he stated that a year ago it was the custom in the Boston City Hospital to irrigate all cases. At that time there were a great many more mastoid cases than they have now. Dr. Moss had told that in the early days it was common to feed many of these cases with a nasal tube, and then the number of middle ear infections was very great. In Dr. Borden's own opinion, the only method of preventing aural infection is by removing any existing adenoid material. A few years ago he had had as many as twenty-eight mastoid cases in one month. Since they have been removing the adenoids from the poor children of the city, the number of mastoid cases has materially decreased.

One of the gentlemen had spoken of the characteristics of these complications in scarlet fever and measles. In his own experience, it is characteristic of measles that these compli-

cations occur in the active period of the disease. If the patients go beyond that period without trouble, they are practically safe. Another characteristic of measles is the strong liability of adult cases to acquire mastoiditis from the middle ear. Adult cases of scarlet fever are not especially liable to mastoiditis. In measles, they are very liable to it. Very few mastoid conditions occur in diphtheria, but when they do occur, they are puzzling. In some of the cases he had seen, after watching for days and days it was finally decided to operate, simply because nothing else could be found to account for the conditions. In some of the cases that have been operated upon there were absolutely no signs of a mastoid condition, and yet a marked effect was going on. Why this was he could not say.

The question of the virulence of the infection had been raised—particularly in institutions. There is a reason for that. In almost all institutions, particularly children's institutions, the inmates have very poor vitality. In the Boston Hospital, for instance, they know that if a patient comes from an institution, it will probably be a very bad case and will probably have complications; if it is what is called a middle class suburb, there are very few complications. Brookline is above the average in wealth, and the patients from there are seldom very ill.

What Dr. Kerley said was true. Young children, as a rule, do not have pain.

In describing the fatal cases in scarlet fever, the mastoid was said to be filled with white, creamy pus; but the diphtheria cases almost all had thick, semisolid, glutinous, and brownish pus, or some other color. It seems to be a very peculiar condition of the mastoid. Lateral sinus thrombosis seldom occurs.

What had been said about the delay of the average aurist in operating was very true. He does not give these cases proper attention.

The most important part of the paper was what had been said about perforations. To Dr. Borden, that in itself was an indication for a mastoid operation, and if allowed to go on for many years it will slough out and leave a large hole.

In all the discussion, nothing had been said about the hear-

ing apparatus. One of the reasons for the mastoid operation is not only the saving of life, but of hearing. To make repeated paracenteses and expect a violent inflammation to drain dry through it, seemed very poor surgery. Another thing is the large incision one is called upon to make for it, because it makes no difference. A large incision extending half way across the drum will in twenty-four hours be of the same size as a small puncture.

It is to be hoped that the time is not far distant when a mastoid operation will be considered in every case where there is a profuse aural discharge lasting for two or three weeks, and it is up to the aurist who allows an ear discharge to continue for day after day and week after week with no other treatment but irrigation. It is altogether a question of the vitality of the patient. If the patient's vitality is strong, then the bacterial discharge will probably cease, but many drums are destroyed every year simply because the aurist has not the courage to open the mastoid and drain it through a large incision, rather than to do a little pinhole operation.

Dr. Borden reiterated that what he had said in his paper referred only to serious cases and not to the mild ones. When he had studied the autopsy reports previously mentioned, he was at first entirely at a loss to understand their real significance. Finally, he decided that the most important point was the influence of the ear upon other parts of the body. He then studied the clinical records, and found in many cases complications of the lung, kidney, etc., the symptoms would subside after drainage from the ear had been established.

One very important phase of the situation no one had mentioned is the low vitality of the patient. The second case mentioned in the paper was that of a trained nurse, a strong, healthy girl previous to the attack of scarlet fever. There were no complications in this case other than in the ear and mastoid, yet the prostration was very great.

The influence of climate was marked, as was the time of year.

Referring to Dr. Reik's statement with regard to the proportion of mastoid cases in hospitals, it may be said that a much greater percentage of aural complications occur in large charity hospitals for contagious diseases than in any other institutions. This is well illustrated by the difference between

the Boston City Hospital and the Somerville Hospital compared with the Brookline Hospital.

Dr. Borden's attention was recently called to tertiary syphilis as a possible cause for chronic otitis media or mastoiditis. A routine Wassermann test was made in a considerable number of cases, but failed to show a single positive reaction.

Too much reliance has been placed upon paracentesis. The textbooks speak of a long incision in the drum membrane. He had performed all manner of incisions, but within from twenty-four to forty-eight hours each would heal, leaving a pinpoint opening as before. The chronicity of aural complications is due to two factors, viz.: the lowered vitality of the patient, and the virulence of the infection.

When a case is watched day by day and the perforation is found to be growing steadily larger, the mastoid operation is indicated. As to postnasal complications in mild cases, the local applications might do good, but are absolutely of no avail in serious cases. According to the pathologists who performed the autopsies previously mentioned, the sinuses were involved in a large percentage of the cases.

Answering the questions as to how he dared give ether in serious cases, he would say that he had given the anesthetic in almost every variety of complication, and had never known harm to result. On the other hand, the operation was followed by distinct relief.

NEW YORK ACADEMY OF MEDICINE, SECTION ON OTOLOGY.

Meeting of November 13, 1914.

Paper: The Difficulties in Closing Perforations of the Drum Membrane in Certain Cases of Acute Otitis Media.*

By Gorham Bacon, M. D.,

New York City.

DISCUSSION.

Dr. Whiting said that any suggestion offering a reasonable probability of overcoming persistent perforation of the ear drum was worthy of careful consideration. He himself had never used the trichloracetic acid of which Dr. Bacon had spoken, but he would certainly give it a trial. Many of these cases are very slow in healing up, and various measures have been tried to stimulate regeneration of the drum. He also said that he had tried chromic acid and the galvanocautery for this purpose, but the results had not been very satisfactory, and in several instances the openings had been made larger than before. In his experience he had found the goldbeater's skin to act better than the paper covering of the opening, as it holds in position better the ordinary cargile membrane. It is easier to apply and to keep in position. The suggestion of trichloracetic acid, however, seemed very timely and likely to prove effective.

Dr. Lederman said that he wished to corroborate what Dr. Bacon had said about trichloracetic acid, as he has been using it for over ten years and had found it especially useful in some subacute and chronic cases. For covering over perforations which would not close, he has used the ordinary rubber tissue, cutting it the proper size and changing it from time to time as it becomes hardened. It seems to act very nicely. Dr. Gleitsmann had suggested the use of trichloracetic acid years ago, following the application of the galvanocautery in nose and throat therapy, to limit the reaction which frequently

*See page 59.

appeared. It acts as a stimulant and leaves a very nice, dry eschar, causing very little local disturbance.

Dr. Bacon said that he was pleased to hear that Dr. Lederman had used the trichloracetic acid for so long. He himself has been very much pleased with its action, as it has proved better than anything he had tried before. He has used it in a number of cases with very satisfactory results.

Replying to an inquiry, Dr. Bacon said that he uses the trichloracetic acid in concentrated solution.

Paper: Mastoid Skiagraphy as a Surgical Diagnostic Aid.

By George S. Dixon, M. D.,

New York City.

DISCUSSION.

Dr. Bacon said that the hour was so late he must be very brief in what he had to say, but that Dr. Dixon was to be congratulated on the wonderful work he has done in skiagraphy. At the New York Eye and Ear Infirmary the valuable assistance he gave in diagnosing doubtful cases was greatly appreciated. He felt that the clinical symptoms were the most important in making a diagnosis, but that skiagraphy was a valuable aid in doubtful cases. In one of the doubtful cases to which reference had been made, the patient was seen on January 10, 1914. He had pain in the ear in March last, preceding a cold, and had also had pain in the mastoid process. The drumhead was incised several times. The membranes healed in a month's time, but the patient was not entirely well until a month later. That was before he came under observation. When seen January 10th he had had no trouble until two weeks ago, when he took a cold and had pain again, and the drum perforated spontaneously. He had severe pain, not only in the ear, but on the side of the head, and a temperature of 99 3/5°. The pain was described as of a throbbing character. As he had given a history of previous trouble with pain, and since he had a slight rise of temperature, he was sent into the eye and ear infirmary for observation, although the drum membrane remained perfectly clear, with all of the landmarks visible, and there was only a slight tenderness over the mastoid process. That was the case which Dr. Dixon showed

with a pneumatic mastoid, and the cells were identical on both sides. The patient had this severe cold and all of his mucous membranes were more or less inflamed, including the nose and sinuses. He was treated for this condition and cured, and left the hospital without operation. In this instance the skiagraph was a great help, for otherwise an exploratory operation on the mastoid process would have seemed necessary.

DR. DENCH said that every one appreciated the importance of the work done by Dr. Dixon, especially as he had undertaken it with the idea that it would not accomplish very much. Certainly the plates that had been shown testified to the great advance that has been made in developing this work so as to afford valuable assistance in diagnosis.

One of the plates had proved particularly helpful. Although it was positive, the case did not come to operation. So far as Dr. Dench knew, this was the only instance in which they had a positive plate without operating upon the patient. The clinical symptoms outweighed the evidence of the plate, and upon Dr. Dixon's advice he did not operate.

In another case, shown early in the evening, the patient was a diabetic, and had a streptococcus capsulatus infection. He seemed to be doing very well, but on account of the X-ray plate an operation was performed, and it showed exactly what the plate indicated. The man made a recovery, but excepting for the evidence of the plate it would have been thought that he was doing well, and the case would probably have terminated fatally.

In the case where Dr. Dixon had showed an abscess over the sinus, the condition ran for a long time, a capsulatus infection, but the man had no pain. He was operated upon, however, and the condition found was just what had been shown by the plate.

Dr. Dench said that of the two plates showing epidural abscess, one was a very obscure case. Everything cleared up. The patient came in with a narrowing of the canal. Plates were made, and he and Dr. Dixon studied them very carefully and found two spots over the sinus. Epidural abscess was suspected, and operation confirmed this finding. The two spots over the sinus were found with erosion of the walls of the sinus.

In the plate showing the broken down mastoid, he had seen

the patient in consultation, and the operation was performed by a confrére. The mastoid was found to be broken down, just as shown in the plate.

Another one of the plates showed a very interesting development to which Dr Dixon had referred. Ten years before the patient had had an attack of otitis, which was cured. Then she had a second attack—a pneumococcic infection; and this year she had a third infection, with capsulatus. In that case the X-ray plate was a little cloudy. The patient made a perfect recovery. The cloudiness was probably due to the previous attacks she had had. It should always be borne in mind that the patient may have had previous attacks which went on to sclerosis—sclerosis secondary to a suppuration. That emphasizes a very important point which has been brought up by Mr. Cheatle—whether sclerosis is the result of an inflammation, or whether it represents the infantile type of mastoid and is the cause of a chronic suppuration. These plates show that in a large proportion of cases a sclerotic mastoid is the result of suppuration, and not that the suppuration is the result of an infantile type of mastoid.

Dr. Whiting said that one of the cases which Dr. Dixon had presented served to show how valuable this assistance may prove under some circumstances. The patient was a young man who contracted middle ear infection while sailing in the South Seas, and he could not have proper attention for ten weeks. His ear had discharged for four or five days; but by the time he reached New York there was no evidence that he had any suppurative process, much less a mastoiditis. He came to Dr. Whiting because of a feeling of numbness on that side of the head, and when he shook his head he experienced pain. Inspection revealed nothing to indicate any suppurative process; but the patient was sent to Dr. Dixon for a corroborative diagnosis, for the bone was somewhat tender over the region of the emissary vein. The plate showed that there was suppuration of the mastoid cells, the case was operated upon and an extensive destruction of the bone was found with epidural abscess. Under ordinary conditions it would have been impossible to have made that diagnosis.

Dr. Whiting said that the plates which Dr. Dixon had presented were seen under most disadvantageous circumstances. The plates require a very brilliant illumination, and any one

who had not seen them under such conditions might think that perhaps a good deal was taken for granted; but under favorable illumination the method which Dr. Dixon had illustrated was of very great assistance in cases which are difficult to diagnose.

Dr. Kenefick said that he wished to join with the other surgeons of the New York Eye and Ear Infirmary in acknowledging the value of this aid and also to express his especial indebtedness in cases with obscure diagnosis, and told of two cases, then under observation, in which it was expected that Dr. Dixon would clear up the diagnosis.

In Dr. Dixon's description of the plates, one or two points of especial interest had been brought out. One of these was the similarity between pictures of the infantile or sclerotic type of bone and bone in which the septa are broken down and the resulting space is filled with granulations or pus. A plate had been shown of a case in which the diagnosis was said to be either "purulent" or "sclerosed." Evidently this important point cannot yet be determined definitely by skiagraphy, though it will probably be cleared up in time. In certain fulminating cases of acute purulent otitis which can be explained only by a possible dehiscence in the roof of the tegmen tympani, it would seem that by prompt skiagraphy some helpful information might be obtained.

Dr. Law said that he had been very much interested in Dr. Dixon's demonstration, and that all who were interested in this subject were indebted to him for a great deal of very excellent work. No one who had witnessed it could fail to be impressed, for he had instructed many on points which they would not otherwise have learned, as it requires a great deal of time for surgeons to go to the hospital and look up such studies. At the Manhattan Eye and Ear Hospital they depend a great deal on the X-ray and consider it a most valuable aid, particularly in obscure cases. Their technic differs somewhat from that employed by Dr. Dixon, but they obtain pretty much the same results.

Dr. Kenefick had spoken of the difficulty in differentiating between sclerosis and pus. It is possible to tell the difference; with a good plate, there would be no mistake made between a true sclerosis and a collection of pus.

Dr. Dixon had said that he had not seen a plate showing a

clot in the sinus. Such a plate is in the possession of the Manhattan Eye and Ear Hospital. The diagnosis, however, was not made from the plate, but after operation the plate was studied and the clot noticed.

Dr. Lewald expressed his appreciation of Dr. Dixon's work as shown in this demonstration. It was really epoch making, especially when it was remembered that the doctor was somewhat skeptical of its value when he began it. The excellence of his technic has proved that there is a great deal of value in it. Dr. Lewald has been using the stereoscopic method in his cases, and believes this gives information which can be obtained in no other way in certain cases, but for routine work Dr. Dixon's method is certainly the best one he has seen.

Dr. Stewart said that he had been engaged in this line of work for about two years, and it was very gratifying to see that the surgeons are at last taking advantage of its aid in the diagnosis of diseases of the mastoid region. The roentgen findings must still, however, be closely associated with the clinical picture in order to be of depenable value. His own technic differs somewhat from Dr. Dixon's, but the end results seem much the same. He expressed his appreciation of the demonstration.

Dr. Dixon, in closing, said that he had done all he could to show the original plates to the best advantage, and, making due allowance for unavoidable crudities in the projection apparatus, thought the result was fairly satisfactory.

As to the difference between pus and sclerosis, he thought this could be determined in the majority of cases, but not always. In the case of a sclerosed bone with a few cells or spaces and a thick cortex, there might be plenty of pus, and the result would be a white plate.

As to a clot in the sinus, he would not care to make a diagnosis of sinus thrombosis from an X-ray plate. It might be found in the plate after operation, but that would not be of much use to the patient.

JOINT MEETING OF THE CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY AND CHICAGO SURGICAL SOCIETY.

Held May 1, 1914.

DR. OTTO J. STEIN, THE PRESIDENT OF THE CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY, IN THE CHAIR.

Ventricle of the Larynx.

DR. GEO. SHAMBAUGH exhibited a ventricle of the larynx which had been split open and the appendix could be seen running up half way to the top of the thyroid cartilage. The appendix of the ventricle varies, not only in different individuals, but on the two sides. It is always present. It may exist as a slight pitting or depression; at other times as a prolongation that extends up not only as high as the top of the thyroid, fully an inch, but also up to the hyoid and base of the tongue, in some instances. The function seems to be to assist in supplying lubricant to the vocal cords. Under the term laryngocele ventricularis, Virchow described a condition which he found postmortem of elongation of the ventricle, considered by him to be a pathologic condition, running up as high as the upper border of the thyroid cartilage, or, in rare cases, as far as the hyoid bone. Anatomists today believe this condition represents simply an anatomic variation of a normal appendix of the ventricle.

The term laryngocele ventricularis seems a suitable one for the condition the speaker was discussing, where there exists a cystic dilatation of the appendix of the ventricle. This cystic dilatation is a very unusual condition. Hippel, in 1910, made a complete review of the subject, and collected, in all, twenty cases throughout the entire literature which he was able to verify as cystic dilatation of the ventricle of the larynx. Eight of these were discovered postmortem, so that there were only twelve cases that had been observed during life and recognized.

These cystic dilatations of the appendix of the ventricle form in three different ways. Sometimes there is simply a dila-

tation within the larynx, with laryngeal symptoms; at other times the cystic dilatation does not take place in the larynx at all, but the point of the appendix is pushed through the thyrohyoid membrane, forming an external dilatation, so that the only symptom is from the external swelling in the neck. In other cases, like the one he wished to report, there is a double condition—cystic dilatation external in the neck, and also dilatation in the larynx.

The causes leading to this condition are recognized as two: One, the existence of one of these elongated appendices. The elongated appendix of the ventricle is supposed to be necessary before the patient may develop a cystic enlargement. As the active cause, spells of coughing are thought to play a rôle. In the case reported by the speaker a violent fit of coughing apparently started the process. Blowing on a wind instrument has been responsible for a number of cases. In one case it seemed that the cystic enlargement of the ventricle was brought about by Politzeration of the middle ear.

Regarding the symptoms produced, they vary as to whether there is external or internal enlargement or a combination of the two. When external, it is very characteristic, located directly above the thyroid cartilage. It may be quite an enlargement. The enlargement in the neck is a very characteristic condition. It is hardly to be mistaken. It can be reduced by pressure, but this only lasts for a short time and then it enlarges again. The first symptom is usually pain around the region involved. When there is enlargement in the larynx, one gets just the symptoms you would expect—loss of voice, because one vocal cord is covered over by this enlargement, which stops its action, just as any growth in this region would do. If the swelling in the larynx gets large enough, it may produce symptoms of difficult respiration. The patient whose case was here reported had such symptoms at one time.

One of the most annoying features of this condition is the infection that sooner or later often gets into this cystic enlargement. During some acute infection in the throat this pouch becomes infected, and then it remains chronically infected, secreting large quantities of pus. In the case reported the constant secretion of foul pus into the throat, not only during the daytime, but also during the night, has been her chief annoyance. During childhood this patient had expe-

rienced a good many attacks of acute laryngitis, with symptoms of hoarseness and coughing, which would be associated with sore throat, lasting several weeks, and then disappearing. She had a great many such attacks, but they were of short duration. Then she had been practically free from symptoms for twenty years—that is, until four years ago this spring, when she was traveling abroad and had one such attack, apparently the same as those of early life. During a violent spell of coughing she felt a filling up of the neck, developed hoarseness of a marked degree, some pain in the side of the neck. This cystic enlargement never entirely disappeared, although at times it would collapse, and for a short time the voice would be restored. The loss of the voice was, of course, a hardship, but the pus was worse. It was not only annoying in the daytime, but it was still more troublesome at night, when she often was required to sit up most of the night in bed. The pus would fall into the larynx and she had to cough it up constantly.

The year after this cystic enlargement developed she was in Chicago and saw a number of men, and several attempts were made to relieve it. One man operated twice on the larynx itself, attempting to give her relief. Of course, this relief was only temporary. On opening the cyst it would collapse like a punctured balloon, but it would soon fill up again. She consulted a number of general surgeons, and one external operation was made, leaving a scar in the neck. In looking over the case it was quite apparent that any effort to operate in the larynx itself would probably only give a very temporary relief, because there was a big pouch in the neck which would continue to pour off pus into the throat just the same.

In talking the case over with Dr. Dean Lewis, it was thought best to try, first, to get rid of this pouch in the neck, which was done, and the relief following that operation was very marked. The amount of pus secreted was very much diminished, but not entirely eliminated. She was able before this operation, by pressing on the external enlargement, to express a quarter of a cupful of pus at one time. They did not attempt to split the larynx and remove the cyst in the larynx itself, feeling that the removal of this large pouch outside might give relief enough without running the risk of pro-

ducing an injury to the voice. (Dr. Shambaugh exhibited a drawing which was made of the larynx before it was operated.) Later the speaker attempted to make a resection of the cyst in the larynx. It was quite clear that any instrument introduced from above to cut it open would cause a collapse, and he wanted if possible to split the whole cyst from top to bottom. To do this he had a special instrument made (which was exhibited), which he could introduce below the false cord into the ventricle, and then slit it up to the top. The operation was undertaken under cocain. After the splitting of the cyst the voice returned. Then with a Krause biting forceps he bit off piece after piece in front and behind, until he had an opening about the width of his forefinger. The operation lasted fully an hour, because every time a piece was cut out it began to bleed and he had to wait until the bleeding stopped. The result of that clearing out of the larynx has not been as satisfactory as he had hoped. The size of the cyst now is perhaps one-half or one-third what it was before the first operation. The remaining pouch has healed over so that there is just a little fistulous opening, which distends somewhat with pus. But the scar tissue has reduced the size a great deal. There is very little trouble now with the pus running into the throat at night, although it has been more during the last few days. A couple of weeks ago she had an acute sore throat, accompanied by a flareup in the throat symptoms, with chill and some fever.

DISCUSSION.

DR. DEAN D. LEWIS said that Larrey apparently was one of the first to report a laryngeal diverticulum. During the Egyptian campaign he found that several of the people who shouted the verses of the Koran from the minarets had peculiar elastic tumors in the neck at the side of the larynx. It is doubtful whether all these cases were diverticula. Some undoubtedly were vascular strumas. There was, however, a marked interference with the voice, for in many cases the people became so hoarse that they could no longer shout the verses, and they were then assigned the duty of tending the fish ponds in the temples.

After the army returned to France, Larrey noted two cases of laryngeal diverticula in the under officers of the guard.

The extralaryngeal diverticulum appears at the lower and posterior part of the submaxillary triangle. It passes through the thyrohyoid membrane over the upper border of the thyroid cartilage to reach this position. Some cases have been reported where the pouch appeared below, passing through the cricothyroid membrane, but it is doubtful whether these are instances of true diverticula.

The diagnosis is not difficult, but the operative treatment offers many problems. The true extralaryngeal diverticulum can be removed easily. The intralaryngeal methods which have been employed in treating the intralaryngeal sac have not been satisfactory. Laryngofissure gives good exposure of an intralaryngeal sac, but the speaker believes that the best procedure is to split the thyroid cartilage just in front of the superior horn, and to expose the outer aspect of the arytenoepiglottidean fold and the sinus. In this way the mucous lining of the diverticulum and the remainder of its wall can be removed without opening, at least to any extent, the cavity of the larynx.

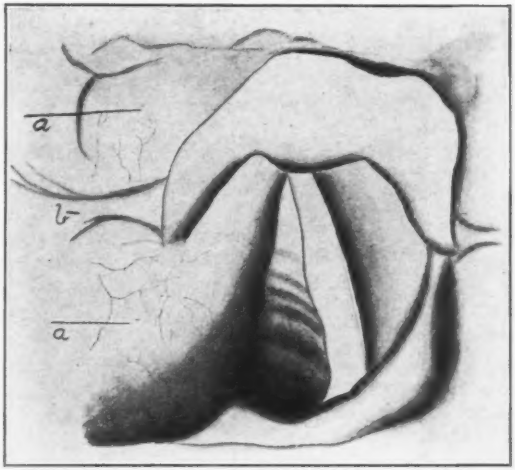
Dr. Otto T. Freer said that the patient exhibited by Dr. Shambaugh and operated by Dr. Lewis was formerly his, and he was the first one to make a diagnosis of her ailment when, what later became a pus sac, was still an air sac. He also had to encounter baffling difficulties in the treatment of this rarest of affections, difficulties which finally pointed out to him an operative method which promised success, when the patient decided to leave his care, so that he could not do what he wanted to do.

At a meeting of laryngologists last winter, at which Dr. Joseph Beck, Dr. Chas. M. Robertson, Dr. Stanton Friedberg, and Dr. Norval Pierce were present, Dr. Shambaugh had questioned Dr. Freer concerning his experience with the patient, who had then come into Dr. Shambaugh's hands. Dr. Shambaugh told him that he was considering a partial laryngectomy for the relief of the condition. Dr. Freer then fully described to Dr. Shambaugh the anatomic relations of the air sac, and told him that as the patient had a perfect larynx and her difficult breathing and loss of voice were due to the mere resting of a mucous membrane sac as a damper upon one cord, even laryngotomy, not to speak of the formidable operation of removing a part of the laryngeal skeleton

by hemilaryngectomy, would, in his opinion, be the wrong procedure, especially as it would not give the desired access to the extensive diverticulum, and would spoil the patient's potentially fine voice. Dr. Freer then suggested, instead, the line of operation which he was pleased to see had been followed by Dr. Shambaugh and Dr. Lewis.

The following is the remarkable history of the patient while under his care. The appended drawing was sketched from life, with all possible exactness. The patient was referred to the speaker by Dr. C. Gurnee Fellows for diagnosis, February 7, 1911. Her age then was sixty-six. She stated that she had been subject to repeated attacks of peritonsillar abscess, the last one in 1893. Her present trouble began in November, 1910, with a feeling of obstruction in the throat, and hoarseness, which did not change.

Examination.—On the left side a smooth, deep-seated, elastic swelling distended the pharyngoepiglottic and aryepiglottic folds, extending to the thyroid cartilage externally, and so effacing the fossa pyriformis. It also filled the left vallecula to the base of the tongue. It covered the left vocal cord, whose border could be seen white and normal, when the swelling was pushed away from it with the laryngeal probe. The portion of the swelling resting upon the vocal cord acted as a damper and made the voice very hoarse. Regarding the tumor as a cyst, Dr. Freer punctured it diagnostically in its posterior part with the laryngeal knife, when, to his surprise, the tumor instantly vanished and he looked into a normal larynx, the patient at once speaking in a clear, natural voice. It was evident that the sac had been filled with air and not fluid. A probe descended through the cut to a depth of two and one-quarter inches, passing downward and outward between the thyroid and cricoid cartilages. In a few days the opening had closed and the tumor had refilled with air. The speaker recognized that he had to do with a diverticulum of the ventricle of the larynx of great extent, forming with the integument a triple layer of mucosa over the left arytenoid cartilage, the left aryepiglottic fold, pharyngoepiglottic fold and fossa pyriformis, creating in effect, when empty, an enormous mucous bursa over these parts. There was no evidence at this time of an extension of the sac outside of the thyrohyoid membrane.



Dr. Freer's drawing of diverticulum of the ventricle of the larynx, made in 1911. a, a, The diverticulum distended with air. b, Pharyngoepiglottic fold.

On March 13, 1911, he reopened the sac in front of the left pharyngoepiglottic fold in the vallecula, his intention being to create a permanent opening, however small, to permit the escape of air from the sac, for its accumulation was evidently due to a valve action in the outlet of the ventricle of the larynx, which permitted air to enter the sac, but let none come out. As before, the sac collapsed, and from this opening he could pass a probe from the vallecula down through the ventricle and out into the trachea below, and could see into an extensive mucous membrane pocket. In spite of enlarging the opening with the Heryng punch and the galvanocautery, it closed again in a few days, and the sac refilled as before. At this time he saw the patient with Dr. J. Gordon Wilson, and they agreed that laryngotomy was unwarranted, as it would injure the potentially fine voice, and could not lead to extirpation of the extensive sac. The indication was to prevent the confinement of air in the sac, and they decided that the best way to accomplish this was to split the sac from top to bottom, cutting through the ventricular band, the aryepiglottic and pharyngoepiglottic folds. This would divide branches or the trunk of the superior laryngeal artery which crosses the fossa pyriformis to the larynx and epiglottis, but a previous tracheotomy would permit tamponade. However, the patient wished no further operating at this time, and the speaker did not see her again until May 6, 1912. Conditions had remained the same until October 13, 1911, when she had another peritonsillar abscess in the left tonsil, which nearly suffocated her until it burst. Dr. Charles C. O'Byrne attended her, performing tracheotomy, and opening a swelling in the neck which obviously connected with the internal sac, and which was full of pus. The suffocative symptoms demanded the tracheotomy. Before he operated, however, the pus had reopened the old opening made in the vallecula and kept escaping at the base of the tongue. When Dr. Freer saw her in May, 1912, after this occurrence, he had for the first time evidence of an extension of the sac into the neck, as the patient could force pus out of the opening in the vallecula by pressing on a swelling over the left half of the hyoid bone. Air entered and left the opening with a squeak, which greatly annoyed the patient. At this time he advised her to let him extirpate the sac in the neck and do the internal operation

which Dr. Wilson and he had decided upon as the best thing to do; but she again left his care, and he had not seen her since.

It is his opinion that the cause of the suppuration of the sac in October, 1911, was bursting into it of the peritonsillar abscess, and he thought that but for this the diverticulum would still have remained an air sac. But for the suppuration its extension into the neck would have remained unnoticed, and Dr. Shambaugh is mistaken in saying that the diverticulum in its air sac stage formed a swelling in the neck—this part of the sac was not filled with air.

In conclusion, he wished to refer to the remarkable article of Dr. J. Gordon Wilson, presented in the Chicago Oto-Laryngological Society some years ago, in which he showed the connection between laryngeal diverticula in man, and the air sacs of the roaring monkeys, specimens of the monkey's larynges with the distended ventricular sacs being shown.

DR. SHAMBAUGH, in closing the discussion, stated that he regrets that he is not able to acknowledge having received any suggestions from Dr. Freer regarding the treatment which was of any assistance in the handling of this case. It is hardly necessary to point out that Dr. Freer has confused the term laryngectomy with laryngofissure. Neither Dr. Lewis nor Dr. Shambaugh at any time had contemplated a laryngectomy, but had considered doing a laryngofissure. The failure to get a more satisfactory result in the work done was because during the removal of the sac they had stopped short of doing a laryngofissure. This part of the work was planned and carried out by Dr. Lewis, who did not even know that the case had seen Dr. Freer two years ago, or that Dr. Freer had offered suggestions regarding treatment.

DR. FREER said that Dr. Beck heard him make the suggestions.

DR. LEWIS, in closing, said that he thought the only thing that ever cured cases of laryngeal diverticula was laryngofissure. He exposed the sac by the external operation, and thought that by splitting the cartilage and everting it the fissure would fill up again, but it did not. The whole operation could be done by splitting the cartilage laterally, because the thyrohyoid membrane is exposed. The external sac is exposed, and the work can be done from the outside.

Complete Laryngeal Stenosis Operated on by Laryngofissure and Laryngostomy.

DR. JOSEPH C. BECK exhibited a baby, one and one-half years old, with the history that the baby fell over a bureau drawer and struck its larynx. The child was then taken to a doctor, because of difficulty in breathing, who said that the child must have swallowed or inhaled some foreign body. The patient was then sent to a hospital, where an X-ray picture was taken, which it was thought showed a foreign body, and operation was advised and performed, but no foreign body recovered, and so search for it was abandoned. Following this a tracheotomy was necessary, and the tube had to be retained. If the tracheotomy tube was removed at any time, it led to a choking sensation. Then the child was sent to a general surgeon for examination, and he found nothing to explain the condition, and inserted a larger tracheotomy tube. When the speaker first examined the case he found that the ligament that supported the epiglottis must have been separated, because the epiglottis seemed to be lying over on one side. On looking between the cords he found a complete blocking below that point. He decided to operate by laryngofissure. Chloroform was used as an anesthetic, as ether had been previously used very unsatisfactorily. He took the anesthetic very badly—in fact, collapsed, and was practically dead on the table. Artificial respiration being resorted to without any response, the operator placed his mouth to the tracheal fistula and inflated, causing breathing to return normally. Then a laryngofissure was performed, resecting the scar tissue within the larynx and trachea, and a laryngostomy tube inserted—the up and down tube of Jackson, which has served the speaker very well in all his cases. This laryngostomy tube was left in for ten days, being covered in addition with a rubber tube. The tube has now been out about ten days, and the child at the present time is able to breathe through the mouth without any difficulty; the external opening is practically closed. There are a number of scars on the neck, and Dr. Beck is going to do a subsequent plastic operation on the child. The child has no voice, and has not uttered a sound. .In most of these laryngostomy cases it is necessary to do a plastic operation subsequently to close the external opening, but in this case it will not be necessary.

The second case was that of a man, first seen three years previously. He came to the hospital with symptoms of marked suffocation, requiring immediate tracheotomy. At first it was thought to be due to carcinoma, but removal of a piece of tissue showed on examination that it was of a different nature, proving to be a marked case of syphilis. It was impossible to introduce anything through the larynx at any time, and after a tracheotomy tube was worn for some time the larynx was split. After he was treated sufficiently for the syphilis so that a negative Wassermann was obtained, the larynx, however, remaining absolutely obstructed, the speaker operated, doing a laryngostomy. The laryngofissure had to be done with bone forceps because the thyroid cartilage was ossified (shown subsequently by microscope), introducing a very large up and down tube, which was left in place for two months. It is necessary in these cases to retain the tube for a long time, packing on top of it, in order that the thyroid cartilage remains open. Later the wound is closed by laryngoplastic. The method used for closing the larynx after the cartilage remained open was illustrated by the speaker on the blackboard. The patient breathes perfectly normal, and has a hoarse voice, but a fair one.

The third case was one of a man who had a chronic suppurative ethmoiditis that caused secondary perichondritis of the larynx, making the breathing impossible. It was impossible to get anything through except a very small probe. Immediate tracheotomy was necessary. Incisions within the larynx and dilatation were tried, but were not successful, so the speaker decided to do a laryngofissure and subsequently laryngostomy. At operation a very large stricture was found in the trachea, close to the substernal notch, a stricture that would not permit the passage of a small pencil. The whole interior of the larynx and trachea, for that matter, was filled out with a mass (of which the speaker showed specimens) of hypertrophic mucous membrane. The epithelium was enormously thickened, as was the epithelial tissue. He proceeded in a similar manner as in the other two cases, putting in an up and down tube, packing on top of it, and finally succeeding in keeping the larynx and trachea open. Then he wished to close this external opening with some solid structure, instead of skin, fearing retraction. He thought he

would transplant a rib as a support, and, therefore, put a piece of rib into the subcutaneous tissue in the neck in close proximity to the opening, planning later to make a flap including the healed-in rib, but there is where Dr. Beck made his first mistake. He simply made a flap with the rib in it, turned it over and sewed it into the gap of the thyroid cartilage, thus closing the wound, but he failed to cover the granulating surface at once with skin from the other side. This piece of rib was lost, and that first operation was a failure. Then he decided to try the Kusch operation of transplanting a toe to the hand and then the neck. However, the patient was frightened one night during sleep, shifted his position within the cast, and severed toe and hand. This operation was also a failure. Dr. Beck intended to implant another solid body, namely, transplanting the clavicle, using the Manley method.

(Since presenting the case, this last mentioned operation was performed with success, and about two months later the final closure of a little slit was made by employing the neighboring skin. The patient has only three fingers on one hand, and that is the reason why Dr. Beck did not employ the finger method of closing the larynx defect. The result is fair breathing and a fair voice. It will be necessary, however, to employ dilatation to enlarge and keep up the breathing space. Dr. Beck has done this on the patient several times by the suspension method. He wished to call attention to the introduction of an intubation tube by suspension, which is very easy of performance.

DISCUSSION.

Dr. Otto T. Freer suggested the method of taking a fine dental circular saw with a dental handpiece for the purpose of entering these hard places of blocked-up larynx. He referred to a case of a larynx of this sort in a case of carcinoma, where he did a laryngostomy. With this saw it is possible to make a fine line, without any other violence, such as the bone forceps naturally implies.

Dr. J. Holinger said that in 1898 or 1900 he saw a patient with fracture of the larynx. The man was a plumber's helper, and in carrying a cast iron sink up a steep incline fell and struck with his neck on the edge of the sink. He lost his voice at once, and had difficulty in breathing. He came to the

speaker the next day. The larynx appeared compressed from the front backward against the vertebral column. The lower part of the phraynx was normal. Apparently only the vocal cords were injured. They were immovable, red and swollen. The hyoid bone was not fractured. Dr. Holinger compressed the larynx from both sides, whereupon, with distinct crepitus, it took its normal form. When he looked at it again it was evident that the fragments had adapted themselves very nicely. Nothing else was done, and after about five weeks the voice came back and the patient made a complete recovery.

Dr. Holinger asked Dr. Beck how he thought the fracture of the hyoid took place; which part was fractured, and what was the displacement of the pieces. Furthermore, he would like to know what the conditions are at the present time—are the fragments movable; are they united, and are they in anything like normal position?

DR. BECK, in closing, said that he did not see the baby at any time during the accident. It is now about eight months since the accident occurred. He found the hyoid bone intact, and everything all right. The trauma occurred below the cords; the cords themselves were all right. When he opened the larynx he found this mass of connective tissue subglottic. He did not think that the operator who looked for the foreign body went in the larynx at all. The cords are all right, and the child will have a good voice when it learns to speak.

Radical Mastoid.

DR. CHARLES M. ROBERTSON said that simple mastoiditis is caused by lack of drainage in the drum membrane. The general surgeon thinks he can do a mastoid as well as a specialist, and for that reason he spoke more particularly to the general surgeon. We say, then, that a mastoid is a sequel of a suppuration of the middle ear. Nearly all suppurations of the middle ear, where the discharge is profuse, are due to mastoiditis. This suppuration extends at least into the antrum cell of the mastoid, and perhaps to the terminal cells.

In small children, the openings on the surface of the bone allow a great deal of pus to escape into the subperiosteal space, and in these cases the mastoiditis becomes a subperiosteal abscess. The old method of treating such cases was to cut down by the Knight incision, to allow pus to escape, and

the operation was then supposed to be completed, and was known as the simple mastoid operation. That is no operation at all, and has nothing to do with the mastoid. If these cases were allowed to go on, the pus would probably break through.

The mastoid operation, as he has seen it performed by the general surgeon, consists in boring a hole into the mastoid and letting it go at that.

As we understand the simple mastoid operation, it is an elimination of all of the cells, whether they be deep or superficial. There are two types—one, conserving the mastoid antrum, and the other, sacrificing it. In acute cases of mastoiditis some of us have an idea of saving the antrum cell of the mastoid, for the reason that the case heals better, and we have, as a result, a middle ear that is added to by the antrum cell. In the old operation, however, the antrum cell is destroyed. This is supposed to give a better middle ear, but whether or not that is going to take the shape of a policy that will be proper or not, the speaker did not know.

There is another mastoid operation, called the antromeatal operation, in which the simple mastoid is done, and after that is completed the posterior wall of the external auditory canal is cut away down to within three or four millimeters of the aditus tympanicus, and the meatal flap is pushed back through the wound, and the cavity treated through the meatus instead of by the wound opening behind, which is done in the simple operation.

In the radical or complete operation the mastoid cells are completely exenterated. The bone is cut down over the attic. The attic, the aditus ad antrum and the external auditory canal and mastoid cells are all drawn into one cavity and the eustachian tube destroyed. Very many radical operations are made on cases that exhibit chronic discharge, and these chronic discharges should be differentiated before an operation is made. There are very many cases of chronic discharge of the middle ear in which the discharge does not come from the antrum or the mastoid cells. Many of these cases are now operated on by the radical method, when they should not be operated at all. They are cases of weeping eustachian tubes.

The speaker did not go into the indications of the different forms of operations, only that we say in the simple mastoid

operation we drain the cavity of the mastoid cells for a lack of drainage, which lack of drainage produces temperature and other symptoms, and in severe cases indications of brain complications, such as sinus thrombosis or meningitis or extradural abscess. The meatal mastoid operation is used when we desire to produce a very fine cosmetic effect, but is contraindicated in all cases of tuberculosis and syphilis, and in cases where there are cholesteatomatous masses.

Preservation of hearing is the main feature in doing the simple and antromeatal operation, while after the radical mastoid operation the hearing is usually not so good as before. One reason for this is because the middle ear is obliterated, the ossicles are gone, the drum membrane is destroyed, the eustachian tube is closed, and the ear is covered with an epithelial lining rather than mucous membrane, and on account of this the oval window does not transmit the sound as it should, owing to the inelasticity of the skin covering the oval window.

The speaker next called attention to certain markings on the outside of the mastoid process of the temporal bone, which are not mentioned in books, one in particular, the lamina cribrosa, which he always observed gives a lot of assistance in marking out the line for operation by denoting the depth of cells over the sinus. (Dr. Robertson then illustrated the steps of the operation on the blackboard.)

The method he has adopted in operating on cases of mastoiditis, which makes the work very simple, is as follows: First, he determines the line of incision; the top of the opening in the cortex is on a level with the top of the meatus, and is three or four millimeters behind the meatal orifice. The original opening is a round hole, and he goes down immediately, so that at a depth of one and a half centimeters he is directly in from the spine of Henle. He then enters the antral cell. Then the external cortex is removed throughout. Next he chisels out the tip cells of the mastoid, paying no attention to the tissue between this and the antrum cell until the mastoid tip is entirely clean. Thus there are two holes, one in the tip and one in the antrum, and the lateral sinus lies between, covered by cells. After exposing the lateral sinus wall, the posterior angular cells are taken out. After that the simple mastoid operation is completed, and then we

come to the second step, which is cutting down the bridge. So many operators have so many different ways, all just as good as the one employed by the speaker, but he thinks this is the simplest one. (Indicating on blackboard.) After this he pays no more attention to the mastoid cavity. He makes a cut directly on a level with the floor of the cranial cavity, coming forward as far as the anterior border of the meatus. Care must be taken not to come too far forward, for fear of opening the glenoid fossa. In cases where the external convolution of the brain dips down, the floor of the brain can be followed until reaching the level of the second convolution. On approaching the middle ear, care is taken not to get any of the posterior wall of the external auditory canal at all. He cuts clear through on the superior wall into the middle ear. After that he has no trouble about the facial nerve, because it does not come above this point. He has no trouble with the semicircular canals, because he knows that they are at least below the upper third or three-fourths of the posterior wall. Then the wall is cut through and the whole ear is exposed. He trims down the posterior wall to the floor of the aditus ad antrum, which finishes that part of the operation. He then destroys the eustachian tube as far down as the isthmus. The eustachian tube belongs to the middle ear as far as the isthmus, and from there down it belongs to the throat. He is very careful in cleaning out the eustachian tube, because he realizes that there is but a thin sheet of bone between that and the internal carotid artery.

Many people do not understand exactly where to find the canal for the tensor tympani muscle. It comes in from the middle ear and extends across just above the oval window. The facial nerve lies just exactly above the tensor tympani muscle. The tensor tympani muscle lies exactly in front of the oval window.

After the whole cavity is thrown into one, the cutaneous canal of the ear is cut, either reflecting one flap up or one down; or, as he generally does, the flap is lifted up into the roof of the cavity by cutting around the conchomeatal margin and splitting the membranous canal on the lowest line. This is practically the entire operation.

If one desires to expose the cerebrum, it may be done from above. If one wishes to expose the lateral sinus, all that is

necessary is to chip off the wall here (indicating), remembering that as you come down on the lateral sinus the facial nerve lies just about a millimeter above it on the posterior wall of the meatus.

In curetting the middle ear we must remember that the facial nerve lies just a millimeter above the oval window, and therefore great care must be taken, because even rough handling of the facial nerve canal is apt to cause grave results.

DISCUSSION.

DR. NORVAL H. PIERCE said that in 1873 Schwartze published his first communication on the treatment of mastoid inflammation; previous to that time there was a strong feeling among otologists and general surgeons against the surgical opening of the mastoid for any purpose. But, based on von Tröltsch's dissections and his own of mastoids, he concluded that it was a safe procedure, and in 1873 published his first communication. From 1875 to 1882 he published the results of a number of cases. He treated both chronic and acute suppurations in the same way. His procedure was simply to do what is now termed the simple mastoid, cutting down and elevating the periosteum and chiseling a hole in the mastoid antrum. In acute cases the results were very favorable, and in chronic cases they were very unfavorable. Most of the cases died of cerebral complications or septicemia. His method of keeping the wound open was varied, but he at last concluded that a lead nail was the best way. This lead nail was introduced into the antrum and kept in place by a steel band that went around the head. Of course, irrigations with various solutions were used, and the matter remained in that condition until Küster published his paper in 1889, in the *Deutsche medicinische Wochenschrift*. His method of treating the mastoid was a part of a general surgical proposition. He endeavored in this paper to establish a method for treating suppurating cavities with noncollapsible walls, such as the mastoid, antrum of Highmore and the pleural cavity. As regards the mastoid, he divided suppurations of the ear into two classes: First, those cases in which the antrum alone was involved, and, second, those in which the antrum and the cavum tympani were involved. In the first class, he operated by the Schwartze method, except that he took away the entire

mastoid covering, his proposition being that no overhanging wall should be allowed to remain in these operations, and that the cavity should be obliterated. In the second class of cases, in which the cavum tympani was involved, he took away the external auditory canal down to the cavum. In certain other cases, where he could demonstrate that the contents of the cavum were diseased and necrosis of the ossicles existed, he removed these and extended a drain from the postauricular external opening through into the cavum, and out into the external auditory canal. Von Bergmann went a little further, and not only took away the external auditory canal—the posterior portion—but also the superior portion of the canal. Then Stacke came along with his flap, which really completed the development of operations on the mastoid as they are found today. All other operations have been modifications of these original ideas.

Regarding the operation on the mastoid in acute suppurations and preservation of what has been called the antral box, the speaker thought this was very important, and he is more and more of that opinion as his experience enlarges, and believes that this fact should not be lost sight of. If we scrape away, or chisel away, or remove in any way the entire three walls of the antrum, we are going to get an overgrowth of mucous membrane from the cavum tympani, which will permanently form a large cavity, lined with very poorly nourished mucoperiosteum, which will be the seat of inflammation every time that the cavum tympani is infected. This is the cause of the breaking down of the mastoid wound which is seen very frequently in children, because this mucoperiosteum has prevented the closure of the wound by the formation of osseous tissue. The speaker could say positively, from his experience, that there was nothing gained by scraping away the walls of the mastoid. Most men held the opinion that the suppuration and softening of the bone took place through the lateral wall of the antrum towards the surface. This is not so. The softening invariably takes place in the floor of the antrum because, as is known, all the mastoid cells, either indirectly or directly, communicate with the antrum; and it is the blocking of these little tubes which communicate with the cells that produces the backing up of the pus in the pneumatic spaces, and it is the softening of the bone about these tubes which

first causes the antrum to break down at the bottom. Almost invariably you will find a fistula which runs downward from the floor of the antrum back of the hard bone of the external auditory canal to the terminal cells of the mastoid. If one is very careful to go from below in dissections, he can find this fistula and get up into the antrum with a probe. When one gets into the antrum in this way, he takes away all the softened bone, wherever it may be, and the posterior cells, referred to by the essayist. Clean away the softened bone everywhere, if you like, but leave the box of the antrum alone, and when the removal of the pathologic tissue is completed put a drainage tube of the smallest size into the preformed antral perforation, and then pack the rest of the osseus wound with gauze. The soft parts are sewed up, except a portion at the lower angle, for the admission of the tube and the gauze. The question might be asked: Why introduce the tube? Is not the hole in the antrum sufficient? The tube, however, serves a very good purpose. After the third or fourth day, without unpacking the mastoid wound, it is possible to syringe out the cavum through this tube, and the fluid either goes through the eustachian tube or comes out through both the eustachian tube and the perforation in the tympanic membrane. In the majority of cases only one washing is required, and then the cavum tympani is found to be dry. The very moment it is found dry the tube is removed, and on the fifth or sixth day the dressing is removed, and the result is that in from one week to three there is complete cure. That is quite an advantage over the old method of operating, and the wound back of the ear is not so unsightly as the old wound, where it was packed open and the soft parts made to fill up the cavity within the mastoid.

The main idea in the speaker's mind was when to perform the radical mastoid, and when not. The general broad proposition is that a radical mastoid should be performed when there is evidence of destruction of the bone within the mastoid in chronic cases, and this is sometimes very difficult to ascertain. Perhaps the best way is to centrifuge the pus that comes from the ear, and if well recognized bone chips are found, then the indication is already present, because we know that the bone is being destroyed, and it is for the purpose of preventing complications such as softening or necrosis up into

the brain, the middle or posterior fossa, or the sigmoid sinus, that operation is performed.

As regards the preservation of the middle ear, which has been advocated by Heath, in the majority of chronic suppurations there is necrosis of the ossicles, especially of the incus, and in a certain number of other cases necrosis of the tegmen tympani or of the promontory, so that Dr. Pierce does not believe, when a case has resisted all manner of ordinary treatment, and a radical operation has been decided on, that it is worth while to consider the preservation of the sound-conducting apparatus, because in these cases the adhesions, dislocations, etc., which form between the malleus, incus, stapes, and promontory, are so great that the hearing is very much reduced in the majority of cases. The advantages of the radical mastoid are far beyond those of any other method of operating, and while it may not benefit or increase the audition, it will not diminish it.

Dr. Otis H. Maclay asked Dr. Robertson, in closing, to mention the technic he employs somewhat more in detail, as it would be of interest to all the members present. The point is, Is it advisable to do much with the bur, or not? Some operators advocate doing practically all the work with a bur.

Dr. M. L. Harris said that in a great many of these cases of mastoiditis, where the trouble was beyond the ear, he has had to go ahead and take out the attic and also operate on the sinus a number of times. When these cases get beyond the specialist they come to the general surgeon.

Dr. J. Holinger said that the radical operation is undoubtedly mutilating. In children, conservative operations will often result in well functionating ears, under conditions where in grown people radical operation would have been indicated. This point was well taken a few years ago by Dr. Crockett, of Boston, and emphasized by Dr. Pierce in the discussion of the evening.

As to treating the sinus, he thought it should be laid bare very extensively, but otherwise left alone. Take away the surrounding bone and eliminate all possibility of retention, but do not touch the sinus itself, because very often there are thrombi which at operation are detached and carried in the lungs. The results of this method are good. He has operated this way for at least twenty years.

He did not think that the difficulties of the radical operation have been sufficiently emphasized. The difficulty in old cholesteatoma is not the great number of cells, but the scarcity of cells. There are usually hardly and cells, and the few are small and difficult to detect. The bone is thick and eburnated, hard. The antrum is not larger than a bean. If there is any gathering of pus in such a case, there is no possibility of drainage. The direction of least resistance is toward the internal ear. He has never encountered any difficulty in finding the antrum, no matter how small it was, by simply following the external canal, then the aditus ad antrum to the antrum. The lateral wall of the aditus an antrum is always difficult to remove. We must ascertain whether or not the incus is present. He has for this purpose a fine hook probe, which allows him to feel through the remnant of the external canal the aditus ad antrum, and by means of this probe he can always find the bridge, even before he is really down at it.

Another point: In making the flap, one must take away the ridge of the external canal to the very bottom. In this procedure the greatest number of injuries to the facial nerve occur. If a part of the posterior wall of the canal is left, it forms afterwards a ridge in the cavity which is always sensitive and often granulating.

The aim of the operation is to create one cavity lined with epidermis; all the excavations and niches must be eliminated.

Coming back once more to the after-treatment of mastoid operations in acute cases: The antrum and cells are supposed to be a reserve reservoir for air in the middle ear. If we wish to advance this function, it is well to inflate air gently by Politzer's method, as soon as the bone wound has been filled with granulations. Stress must be laid on the word "gently." The air must not be forced through the granulations. This will often benefit the hearing and avoid retraction of the drum membrane and adhesions in the middle ear, which may mar an otherwise perfect result.

DR. PIERCE asked Dr. Holinger whether he never opens the sinus in cases of thrombosis of the sinus.

DR. HOLINGER said he never opens the sinus at all. He lays it bare very extensively. The less we work with the sinus, the less chance we have of retrograding advancement of the thrombosis towards the other sinuses at the base of the

brain, and of loosening thrombus masses which may lead to embolisms in the lungs.

DR. ROBERTSON, in closing, said that the following were indications for a radical mastoid: Cases that had not healed from simple operation, and operations for preservation of the drum membrane, and all cases where the bones had lost their integrity should be operated by the radical method. Also cases with ropy discharge of clear fluid coming down from the attic, which is indicative of destruction of the bone tissue.

In those cases of acute suppuration, no matter whether the other cells are affected or not, the tip cell may be affected. If you wish to, it is very easy to destroy the cells of the mastoid, leaving the antrum cells, by attacking it from below.

He thinks that the catheter in the bottom of the antrum would be a good idea. He has never tried it, but will do so when he gets an opportunity.

He attacks thrombosis of the jugular artery and lateral sinus very differently from Dr. Holinger. He is afraid to leave a sinus with a plug in it. In all such cases it has been his practice to tie the jugular off below the plug, so that in the manipulations of the lateral sinus you prevent the sliding off of the thrombosis into the circulation below, and the veins entering the jugular below the bulb should be tied off, too. Then the sinus is fully exposed from the upper space down to the bulb, and the two extremities are closed by temporary plugs by the assistant, and the sinus slit in its entire extent. Then the assistant takes the pressure off the upper plug, and if there is no sinus thrombosis a free flow of blood follows. Then the lower plug is taken away to see if you get a flow from the jugular vein and superior and inferior petrosal sinus. If this is plugged the operation is extended into the neck, and the jugular is either taken out or destroyed by simply tying. Of course, we cannot take away the superior and inferior petrosal, but we can get most of the plug out.

There is usually quite a little swelling for a few days after operation, but after a little the collateral circulation takes care of it.

Dr. Maclay asks for more details in regard to the operation. In his operation he takes off the cortex with the straight chisel or gouge. After that he uses the bur. He has found, with the use of the bur, that it is desirable not to use it to the ex-

tent of making the tissues too smooth. If they are made too smooth, the granulation tissue does not take well, thus retarding the healing of the wound. All of the cells should be destroyed, leaving the bone a little rough.

Dr. Holinger said it was not necessary to do a radical operation on children. That depends upon the symptoms presented. If the child has necrosis of the bone, it does not make any difference whether he is twelve or fifty. It is the condition met and not the age that indicates or contraindicates operation.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, October 29, 1914.

DR. OTTO J. STEIN, THE PRESIDENT, IN THE CHAIR.

Carcinoma Localized Within the Larynx.

DR. OTTO J. STEIN presented a patient, a man, who was operated on about two weeks ago for a carcinoma, well localized on the right vocal cord, occupying the right anterior half, the anterior commissure, and a small portion of the left vocal cord; also slightly subglottically. This case was diagnosed by the usual method of taking out a piece by the endolaryngeal route, and followed in a couple of weeks by the laryngofissure. There was nothing unusual about the operation. However, there were a couple of points he wished to call attention to. First, he thinks that wherever it is possible to operate under a local anesthetic it is advisable to do so. He used the combined method in this case, as he has previously in a few cases similar to this one, by using ether for the introduction of the tracheotomy tube, and then immediately following with the rest of the operation by local anesthesia. In this case he resorted to a method never used before in operating by himself, namely, anesthetizing the larynx by injecting both the superior laryngeal nerves. This gave perfect anesthesia, so that he could work with absolutely no reflexes whatsoever during the entire operation, with the patient awake.

He also did another thing, which he had never done before, and which he thinks of advantage, namely, using an unusually high incision, away up to the hyoid bone, in this way avoiding the severing of the cricoid. That evidently has an advantage in the process of healing. It gave him all the access he wanted to the interior of the larynx, plenty of room without any trouble whatsoever, and it also gave a support afterwards which seems to have hastened healing remarkably. This patient has progressed so remarkably that one would hardly know any such operation had been performed. He has had

no disturbances in any way. He is getting some voice back. There is a fibrous band forming, where the right cord was taken out, back to the vocal process, and over the anterior quarter of the left vocal cord.

Those were the two points he wanted particularly to make, working under this form of local anesthesia, injecting the superior laryngeal nerves with novocain, and preserving the continuity of the cricoid.

DR. CHARLES M. ROBERTSON asked Dr. Stein what the condition was that was present in the commissure.

DR. STEIN replied that there were granulations there. It was too early for any recurrence.

DISCUSSION.

DR. J. R. FLETCHER had had the pleasure of seeing the operation, and was very much delighted with the manner in which Dr. Stein had conducted the anesthesia. He thought it splendid. When he came into the room at the time of operation the patient had had the tube introduced, and thereafter made no manifestation of any consciousness of pain, or anything else, during the entire time of operation. He was conscious and lay there as quietly and serenely as though nothing were being done. There was almost no hemorrhage, and one could see the field of operation very well. It is an important point that the view of the operative field is not interfered with.

DR. J. GORDON WILSON asked Dr. Stein what he injected.

DR. STEIN replied that he had asked for a one-half per cent novocain solution, but was told afterwards that he had been given and had used a one per cent novocain solution.

DR. G. P. MARQUIS asked if there was any hemorrhage following the operation, to which Dr. Stein replied that there was a little.

DR. JOSEPH C. BECK has had some experience with the method of injecting the superior laryngeal in operations upon not alone laryngofissure, but also the operation of laryngostomy in a healed-out syphilitic case, in which he did the complete operation of severing the larynx, removal of the tissues within the scar tissue, and the introduction of up and down tube, with absolutely no cough or reflex, whereas in other manipulations on this patient, thoroughly cocainizing the interior of the larynx, it had been practically impossible to do

anything for him at all. He was very irritable. That method of anesthesia in larynx operations, he believes, is coming more and more into vogue, even in major operations, as laryngectomy. The combined anesthetic, however, he would call the injection of this blocking method, plus the general anesthesia, which has not the purpose only of making the patient insensitive, but further preventing the shock following the operation. He believes it is not only in the larynx that we should think about the nerve blocking, but also in operations on the nose and elsewhere in the region of operation. In other words, coming to the principle of Crile, of anoci-association. The book recently published by Crile on that subject is most interesting, and very valuable to men working in the department of laryngology.

In regard to the question of this procedure for carcinoma, he felt that question should be discussed, namely, as to the value of laryngofissure in carcinoma, as a cure for the disease.

He believes that when the diagnosis is made of a carcinoma within the larynx, the surgeon should be prepared to remove the larynx, because the splitting of it and the laryngofissure produce probably implantation and secondary carcinoma outside. We know that Semon, St. Clair Thomson, Ballenger, and others, have had wonderful successes with laryngofissure. The speaker has seen a few of these, and has also done a few. However, recurrence is very common in his practice of it.

Dr. William L. Ballenger has also had some experience with this method of anesthesia. He had been in Crile's clinic, together with some of the other members of this society, and had seen him do his preliminary operation in total removal of the larynx. He does it under the blocking method. Since then the speaker has tried it a few times in laryngofissure and total removal of the larynx, and found it perfectly satisfactory, as it was in Dr. Stein's case. As to whether the operation for carcinoma of the larynx is successful or not, he has four cases living on whom he operated, one two years ago, and a few months ago this man was perfectly well. When he was in Seattle three years ago last September, he operated on a case, doing the operation of laryngofissure. This patient, a year ago, was reported as being perfectly well. Four years ago he performed a total removal of the larynx—not, however, using this method of anesthesia, but by general anes-

thesia. This patient is perfectly well. There was also another patient down the State on whom he operated three years ago. This patient is still living and apparently cured. So the question comes up, whether or not these operations are successful. The speaker is of the opinion that they are successful. A relatively good percentage of his patients are still living, three or more years after operation.

Dr. Charles M. Robertson has certain rules that he lays down in operating cases of this type, which are about as follows: There are four or six types of cases which we are called to treat. If the growth is absolutely intrinsic and does not affect the perichondrium, a laryngeal fissure is indicated. If the perichondrium is affected, the case calls for complete laryngectomy. If the glands outside of the larynx are affected, there is no use operating at all—the disease has already gone too far. The only thing to do in a case like this, unless we wish to experiment and see how long the case will last by operative interference, is to do a tracheotomy and let the patient be as comfortable as possible as long as he lives.

One carcinoma is different from another carcinoma, although the microscope may show the same findings in both cases. There is a lessened resistance that we have to take into consideration. Even that is questionable, because one case that will look as though the resistance is absolutely at par will go like wildfire; another case, in which the resistance looks nil, will last for an indefinite period of time. While in London this summer he saw a case of cancer of the top of the larynx, in which the upper part of the larynx, the epiglottis and tonsil were involved. While in the hospital this man was taken with erysipelas, and when he recovered the cancer was well. The speaker saw him after two years, and the throat looked normal. He also saw a case of sarcoma which was cured in a similar way. That would bring up the question of injecting these cases with the streptococcus serum, but so far as he has been able to learn this has not been very successful.

Dr. Beck asked Dr. Robertson if he meant Coley's serum.

Dr. Robertson replied that he did not mean Coley's serum; he meant simply a streptococcus serum. He does not think Coley's serum is good. He has not seen anyone who has any faith in it except Coley.

The matter of operating these patients under general anesthesia would be, in his opinion, very greatly assisted by the blocking off of the superior laryngeal, because the reflex in the larynx is absolutely intense, and cocain will hardly do even in the cases that are not very sensitive. In years gone by he has seen suggestion do away with reflex in the larynx, and that, with cocain, will sometimes do very well. You can relieve the reflex by suggestion, but you cannot relieve it with cocain.

He has several cases in town where he had done laryngeal fissure, and he is very much inclined to be in favor of laryngeal fissure, even as a preliminary step to complete laryngectomy, because in looking at the larynx from above you get a perspective, and cannot tell the extent of the growth. It may extend down the larynx to a considerable extent beyond the cord. It also is very prone to affect the esophageal wall, and where this is the case, his experience, and the reading he has done, would indicate that these cases are already beyond the scope of the surgeon. Where the epiglottis and the base of the tongue are already affected, the case is absolutely hopeless.

Regarding operation on these cases: In the type of case reported, for instance, Dr. Robertson always likes to follow the enucleation by the use of the actual cautery. He burns them with the Paquelin right to the cartilage. You might think there would be quite a lot of reaction from that type of treatment, but there is not. When he first commenced that method, he put in a tracheotomy tube for fear the patient would develop an edema of the epiglottis, but has never seen this occur. He, therefore, discontinued the use of the trachea tube.

Dr. Robertson has not had the wonderful experience that Dr. Ballenger said he has had. He has had cases live eighteen months, but that is the longest, after a total laryngectomy. The late stage of the cases may determine the longevity to a marked degree, as they are usually too far advanced at time of operation to promise good end results. His last case died of cerebral embolus the second day. He thought it was a very favorable case, and had expected to see the man get well. The more he sees of cancer—and he has seen considerable of it—the more helpless he thinks we are. Cancer, in his opinion, is a disease that is broader than the tumor. It is a disease that is absolutely in charge of the entire system before the stimu-

lation of the cell commences, and when we operate on a cancer of the throat that is absolutely intrinsic, we may have resistance enough to overcome the condition of the blood, so that the disease will be alleviated or arrested, but it seems to him that when tissues commence to be stimulated and piled up, the case is already beyond hope.

DR. WILLIAM L. BALLENGER said Dr. Robertson had very well outlined the hopelessness of these cases, but he wished to repeat what Dr. Crile told him. A patient called on him, and on examination he found involvement of the tongue, pharynx, larynx, glands—a very extensive involvement—and he, of course, believed the case hopeless. The patient would not hear of this, however, and insisted on operation. The operation was performed, consisting of removal of the tongue, the lateral and other walls of the pharynx, tonsils, glands and larynx, and Dr. Crile said the patient has been well several years. So, then, there are occasionally desperate cases that recover.

DR. ROBERTSON said that he did not mean that he has no hope at all in these cases, but it looks that way to him.

Report of a Bacillus Rarely Found in the Tonsil.

DR. J. GORDON WILSON wished to record the finding in the palatine tonsil of the bacillus erogenes capsulatus (Welch). The tonsil was removed for frequent attacks of tonsillitis in a patient who had had frequent severe attacks of gastro-intestinal disturbance and slight chronic articular rheumatism. The full report he will present at a future meeting of the society. The rarity of its reported occurrence in the tonsil (this is only the second case), and its frequency in the gastro-intestinal canal, together with the marked symptoms which it is reported to occasion, justify its presence being noted.

Paper: The Operation of Choice in Maxillary Sinus Diseases.*

BY GEORGE PAUL MARQUIS, M. D.

CHICAGO.

DISCUSSION.

DR. WILLIAM L. BALLENGER has had considerable experience with the Denker operation, as performed by Hajek at

*See page 52.

least, and also with the Canfield operation, with some modifications—probably an equal experience with each, and he must confess that the Denker operation, performed through the mouth, is superior to the Canfield procedure, in his experience. The Denker operation, as performed by Hajek, which is his model, is a work of perfection. He has never seen Denker do any work. He saw Hajek operate three or four cases three years ago, and with Hajek's lip retractors the field is absolutely open to inspection during the operation. It is just as though the antrum were taken outside of the face and inspected with perfect liberty. That, of course, is the great advantage of this operation. In the Canfield operation, while you can see the interior of the antrum remarkably well, it by no means compares with the view obtained by the Denker operation through the mouth.

With regard to the time of healing: He has never performed the typical Denker operation, using the nasal mucous membrane as a flap. He does not believe there is any advantage in it, because his cases certainly get well as quickly as those mentioned by Dr. Marquis, which were operated with the flap. Neither does he pack the antrum after operation—not even immediately following the operation. He does occasionally put in a very small wick for drainage, but not always, in either the Canfield or Denker operation. He does not believe there is any advantage in packing, but a great disadvantage. There is always the possibility of retention of secretions and subsequent reinfection.

He has not recently resorted to the mucous membrane flap in any of his sinus operations, and does not feel that his results justify him in attempting it now.

The point he wished to emphasize was that if the Hajek lip retractors are used, a remarkable view of the field will be obtained. In his opinion, the Denker operation without the flap, and, if desired, with it, is the operation of choice in chronic empyema of the antrum of Highmore. He does not believe, however, that it is best to remove the contents of the sinus in all cases—perhaps in none. He believes with Dr. Myles, of New York, that the antrum is too large a cavity to ever completely fill with granulation tissue. If you do a complete denudation of the sinus, it only partially fills, and there will be a suppurating surface left. He did not know

if Dr. Marquis implied that there should be a complete denudation. Of course, the obviously diseased tissue should be removed. But one should always be careful to leave some periosteum in these cases, because we cannot hope to get complete filling in of so large a cavity by granulations, and in that case there is liable to be more or less discharge from that cavity for all time to come.

Dr. Joseph C. Beck, in view of what Dr. Ballenger said, namely, that he believes, with Dr. Myles, that the antrum cannot be obliterated, said that he thinks it can and does become obliterated, and that it is necessary in some cases to resort to that method of treatment when the intranasal method or the Denker operation is performed, and does not cure the case. It is not his fortune to cure these cases in three weeks. In the majority of them he finds that they suppurate for some time, and many of them do not get well unless he attempts to obliterate the cavity. The statements made about chronic suppuration were too broad, without mentioning something of the pathologic conditions present in the antrum. If it is a simple infection, no necrosis having taken place, then any simple method of treatment will suffice. But where necrosis and true granulations exist, such cases will continue to suppurate until that bone is healed. It is no different there than in the mastoid or any other cavity lined by mucous membrane and exposed to the external world. Therefore, he believes there are certain cases that the Denker operation, nor any other less radical operation, will not cure. He has had two cases in which he exposed the cavity obliterated on account of a neuritis secondary to the operation of obliteration, in which he found the cavity had entirely closed, the opening into the inferior meatus being only a small dimple. In the second case he did not operate, but inspected through the opening with the pharyngoscope, and it had filled up with granulations. In such cases it is necessary to remove a greater portion of the bone, in order to make the cavity, so to speak, collapse. You must go underneath the malar bone and remove the bony structure. In these operations he employs the electric bur, drilling all through the cavity, and shaving off the bony surface almost to the outside periosteum of the antrum, orbital as well as any other place. He realized the inconvenience from a secondary neuritis or neuroma of the inferior

orbital nerve, but he has not seen any great difficulty with that, and it is easy enough to control, if there is any secondary pain, by injections of alcohol into the inferior orbital foramen.

Dr. Charles M. Robertson said Dr. Marquis had said that he thought perhaps in cutting the flaps as advocated by Dr. Robertson there would be difficulty in the curling up of the flaps. That is to a marked degree untrue. The mucous membrane and the perichondrial layer on the nasal side make a very thick flap, and it is a flap thick enough so that you can mould it to suit yourself. It comes to the technic in packing the antrum to hold the flap in place until it heals. That is rather a difficult thing to do, and requires a good deal of care, but if one is careful in putting the packing in (the speaker always dresses his cases) to get the flaps in place, they will stick.

Dr. Beck had raised a very good point regarding the pathologic condition that is present. In cases of infections of the mucous membrane, Dr. Robertson does not pretend to take out the mucous membrane of the antrum any more than any other place in the nose. If there are polypoid degenerations, the polypoid degeneration is removed. He does not know just whose operation he performs, but he thinks it is the Caldwell-Luc rather than the Denker, although he does not follow either one, but a combination of both. However, he is particular about cutting away the antrum wall, destroying the anterior angle. The neuralgia, or lack of function of the superior dental nerve, of which Dr. Marquis spoke, occurs because he gets too close to the floor of the antrum and injures the superior dental in the bony canal. The superior dental nerve is very often slow in recovery, and very slight massage with a curette will sometimes injure it enough to disturb the function for some time. The lip neuralgia and lack of sensation are probably due to the stretching of the skin of the cheek during the operation, and will disappear after two or three months.

In regard to destroying the antrum by the method Dr. Beck spoke of, one must be careful in any cavity in allowing granulations to go on. We see that very often in the mastoid, where granulations are allowed to become rampant. The granulations adhere to each other and form cavities which will produce suppurative cavities. If anybody were to oper-

ate on any cavity in his body he would require him to superintend the granulation, allowing it to progress gradually rather than to go as it pleased. As a matter of fact, Dr. Beck said that the cavity was absolutely destroyed, and that there was only a dimple of an opening in the nasal wall. This shows that the antrum, if the mucous membrane is denuded, will close, and that is one reason why Dr. Robertson is particular about folding flaps into the antrum, so that he knows the opening will stay there forever. The Denker operation, in throwing the flap down on the floor of the nose, will allow an opening, but not as you leave it at the end of the operation. By the speaker's method the opening stays where he leaves it, because he has measured these openings five and six years after operation, and they are just where they were when the operation was completed. The matter of taking away bone would be the only way in which you could destroy a cavity like this; get the bone so that granulations come from bone tissue. When Dr. Brophy read a paper before this society last spring, it was stated that cavities in which the mucous membrane was removed healed over by epithelial tissue, and that epithelial tissue was prone to be very easily infected, because of lack of vitality. That is one reason why Dr. Robertson likes to leave mucous membrane in the antrum, which will close over the periosteum and meet the mucous membrane flaps that generate from the mouth of the opening, as he expects to leave them. It seems to him that the Denker operation, or the Caldwell-Luc-Denker, if you call it so, is the only operation, and it seems to him that in all of these cases, unless you just scratch out the antrum a little and leave all of the mucous membrane in place, they must necessarily be packed. If you just curette a little of the mucous membrane, there is not any particular idea in packing the nose, although, to him, it is absolutely essential that he put in dressing. He has never seen any after-effects from infection by reason of retained secretions. That is a reflection on the man who puts the packing in the nose. He drains rather than packs, and there is a great difference in the way dressings are placed in the cavity. He would expect his cases to go on and suppurate if he put a drainage wick in a cavity. He does not do it in the mastoid, and does not expect to put it in the antrum, although Dr. Ballenger has probably just as good results as he, and he prac-

tices that. He leaves the dressings in for four or five days, and that is the last he treats them, and they get well. The patient washes his own nose out. If these patients are not well in two or three weeks, he thinks there is something wrong in the technic. He would not say that these were the cases referred to by Dr. Beck—disease of the bone—but they are the cases Dr. Marquis spoke of, of infection of the mucous membrane; in other words, chronic cases.

Dr. Norval H. Pierce confessed to a sense of uncertainty as to the outcome of any given operation for empyema of the maxillary sinus, because he has had most extraordinary results from simple opening through the inferior meatus in cases that he believed were very severe, and he has had failures from the Caldwell-Luc or the Denker operations. Being somewhat at sea in this matter, he thought he would become experimental in a case on which he operated toward the end of last winter. It was a severe case with profuse purulent discharge from the nose, in a young girl in the early twenties. He took away the anterior wall and found the antrum entirely filled with polypoid tissue, so that he removed the entire mucosa of the antrum, and found sharp ridges of bone running about this cavity, so that it was divided into various little pockets. With a bur he took away all these ridges, so that at length he had a denuded bony cavity with a smooth surface. He did not open into the nose. He did not even enlarge the normal opening into the nose. He found with a probe that it was quite large. He did not pack the cavity. He sewed up the buccal incision over the bony wound, and the patient had scarcely any discharge from that antrum from the time of operation until he saw her last, perhaps six months afterwards. Dr. Andrews will probably say that this was a blood clot healing. There is no doubt but what that cavity did fill with a blood clot. What happened he has not the slightest idea of, except that perhaps it was a blood clot healing.

Dr. Corwin asked Dr. Pierce if transillumination was done, and what it showed.

Dr. Pierce said that there was always a shadow, both before and after operation, on that side.

He has had failures with every kind of operation. The majority of these cases get well—there is no doubt about that.

But the very cases you think are going to get well are the cases that do not get well. He has at the present time under his care a physician of prominence, and in this case he was very careful to do a thorough Caldwell-Luc operation, except that the nasal opening was in the middle meatus. He took away the diseased portion of the membrane, and left little islands which he thought on inspection were healthy mucosa. He did it under a local anesthetic. Everything went beautifully, but now, after a year, there is still mucopus coming from that man's antrum.

Dr. Beck brought out a very good point. The outcome depends largely on the pathologic condition of the maxillary antrum. If there is granulation tissue, there is also necrosis —superficial carries of the bone—and this should be carefully removed with either a bur or a curette. Personally, he believes that it is essential to be able to inspect the entire antral surface in these cases that resist the ordinary nonradical procedures. This is the essential in all radical operations. He does not believe the Caldwell-Luc, or the Denker, or any other operation will invariably cure an empyema of the maxillary sinus. A statement such as that is rather too sweeping.

Dr. J. Holinger, in the early part of the past summer, operated three antra according to Professor Denker's method, and since July five more. Before the beginning of last summer a number of cases had been operated upon, and had been under control over since. He had had the good fortune to assist Professor Denker in an operation in Boston, and does not deviate at all from the operation as he saw it at that time.

Regarding the pathology of the suppuration of the antrum: He considers it the advantage of the Denker operation that the whole cavity can be controlled; the pathology—whatever it is—can be seen and felt. The great variety of findings in the different cases has already been mentioned. Ridges, and even bony septa which close out parts of the antrum, are seen and removed. Necrosis of bone can be seen. Polypoid and even malignant degeneration of the lining may be recognized and properly dealt with.

As to the removal of the membrane by means of the curette, he has more than ever the impression that it is better to have even a polypoid, degenerated membrane than no membrane at all. He does not, and Denker does not, remove any of the

lining of the antrum except from the floor, where the flap of the nose will cover the defect. The results, as he has seen them, have been universally good. Amongst the patients he operated in August, there was one who had been operated on the other side by a member of this society, with another method. Six weeks after the Denker operation he washed both cavities. The cavity that was operated by the other method still contained pus. The cavity operated by the Denker operation was absolutely clean, and did not contain any pus at all.

However, he had to confess to one failure, but that was satisfactorily explained. It was a very old syphilitic case, who did not have—as was shown afterwards—a suppuration of the antrum of Highmore alone, but of both antra of Highmore, and also of the ethmoidal and frontal sinus—that is, a pansinusitis. The other sinuses did not cause any clear symptoms, and became evident only after the operation. An X-ray picture showed the frontal sinuses absolutely normal, and later on the speaker could wash out a lot of pus from them. He wished to remind the members that syphilitic suppurations of these parts do not yield to iodid of potash and mercury, nor even to salvarsan. Dr. Louis Schmidt cautioned him not to use a strong antisyphilitic treatment in these cases, at which Dr. Holinger was surprised, but Dr. Schmidt insisted that such treatment often makes the suppuration worse, and such was the case. In this case all the cavities have been washed out every day—the antra, frontal and ethmoidal sinuses—which is a very tedious work, and the patient has improved remarkably in a very comparatively short time. That is, he has improved more in two weeks than during the two months previous.

In repetition, except for this syphilitic suppuration, all his cases have done very well, and he included amongst these cases with degeneration of the mucous membrane, with different kinds of septa, with necrosis, and all the pathologic changes that had been named. Denker always emphasizes the point of smoothing away from the floor the last remnant of the wall between the antrum and the nose; no ridge must be left, so that there is a perfectly smooth floor from the nose into the antrum. If there are difficulties in the after-treatment, you will sometimes find that this point has been overlooked.

Dr. George E. Shambaugh said that when this subject of

the operations for the relief of chronic maxillary sinus empyema was discussed last year, he had called attention to the favorable results which he had seen in a number of chronic cases where the opening had been made through the middle meatus. In listening to Dr. Marquis' paper he had not noticed that any mention was made of this method of curing chronic empyema of the maxillary sinus. The speaker believes that an operation through the middle meatus could be more properly considered the operation of choice for the relief of empyema of the maxillary sinus than the radical Denker procedure, which should be reserved only for cases where the simpler operation fails to give satisfactory results. He has already had quite a series of these cases, and has been not a little surprised at the favorable results obtained. He does not believe that it is possible to tell positively before going into the maxillary sinus just what conditions will be found when the sinus is opened up. For this reason it does not seem logical to designate the most radical operation as the operation of choice for the relief of chronic empyema of this sinus, when the much simpler procedure will permanently cure many of them.

The operation is performed by taking off the anterior part of the middle turbinated body and then breaking through the nasal fontanelle into the maxillary sinus, and with suitable forceps making a large opening, one-half to three-fourths inch in diameter. The whole operation can be performed in a very few seconds under cocain. It seems that allowing the air to enter freely into the maxillary sinus is sufficient in itself to bring about a cure in many cases. In some cases where the discharge is persistent, it is possible for the patient to irrigate the sinus very successfully at home by the use of an ordinary eustachian catheter. The patient should be taught by tipping the head forward how to empty the sinus of all fluid after irrigation. The writer does not believe that the presence of polypoid degeneration of the mucous membrane of the antrum renders the case unsuitable for this method of treatment. There can be no doubt that extensive changes in the mucous membrane of the antrum return to a normal condition after allowing free ventilation through an opening in the middle meatus.

There is no objection to this method of operating that some of these cases do not get well with this simpler procedure.

Where a case still continues to have enough annoyance after this operation to warrant a more radical procedure, then one may go ahead with the Denker operation. Since the speaker has had the opportunity of seeing Professor Denker do his operation, he has been convinced that this is the best method for the relief of otherwise intractable empyema of the maxillary sinus.

DR. A. H. ANDREWS was pleased to hear Dr. Ballenger say that he did not make the flap in breaking down the wall between the nose and sinus, and also to hear him say that he did not pack these cavities. If he had said that he did not wash them out afterwards he would have been still more pleased.

DR. BALLENGER said he had intended to say that, because he does not wash them out afterwards.

DR. ANDREWS was also pleased with Dr. Shambaugh's position. Personally, he does not know of any way to tell before operating just what the conditions are in the antrum of Highmore. He does not know of any way to tell whether it is a chronic or subacute case. The history usually is not clear. The patient himself does not know when the trouble began, how long it has existed, or anything about it. They frequently do not know they have any trouble until examination for some obscure nasal trouble discloses pus in the antrum. He has followed the plan mentioned by Dr. Shambaugh almost invariably, unless the patient has come from a distance and must have something done that offers the best chance of ultimate recovery, and must have it done at once. He always goes in through the middle meatus, makes a considerable opening, cleanses the cavity with a current of compressed air, and sees how the condition gets along. Anyone who has not used that method will be surprised at the number of cases that will require no further operative treatment. Once in a while one will continue to discharge, and then, as said by Dr. Shambaugh, a more radical operation can be performed. The speaker is of the opinion that he treats his share of these cases of disease of the antrum of Highmore, and if his observation is worth anything at all, it is this: that they will get along far better if water is kept out of these cavities than if the douche is used. We have very sufficient and adequate means of cleansing the cavity by compressed air, and every drop of pus can be blown out. It is an easy procedure, and his patients

have gotten along very much better since he has done that than when he used the douche method.

DR. SHAMBAUGH asked Dr. Andrews what he did about the home treatment when he used only compressed air to clean out these cavities.

DR. ANDREWS replied that he did not have them use any home treatment. He has them come to the office two or three times a week, and that is all the treatment they get. With the method outlined, it makes no difference whether they are acute or subacute cases—the treatment is the same.

DR. SHAMBAUGH said that he considers it very important that the cavity should be thoroughly emptied of water after irrigation, as the water acts as an irritant in keeping up the empyema if allowed to remain in the sinus. The patient should be taught how to tip the head forward and to the opposite side, in order to assure the entire emptying of the sinus after irrigation.

DR. A. M. CORWIN thought something should be said in commendation of this excellent paper. Dr. Marquis had in a comprehensive and analytical way gone over those various operations, and that kind of a paper is of value and teaches all of us to think. He is inclined to agree very much with what Dr. Andrews had said. He used to irrigate all these cases, but latterly he has discarded that practice very largely. Occasionally he practices it in the office, but does not let the patient do it himself, except in isolated cases. He has observed that it is not mere irrigation, it is not mere drainage, that cures these cases, but it is ventilation; as shown by the fact that a good opening in the middle meatus will cure many cases, and the forcing in of the ordinary outside inaseptic air is an efficient aid.

The speaker agreed with Dr. Shambaugh in his remarks regarding the choice of operation. The more conservative method should be tried first, to be followed later by a more radical open operation, if necessary.

It does not seem to him that it is possible, through a large opening in the middle or inferior meatus, with a cannula, to blow every drop of pus out of such a cavity, as suggested by Dr. Andrews, but he does believe that the ventilation does act in a mysteriously beneficial way to help nature repair the damage done by infection of the closed cavity.

There is no one practicing this specialty who has not had

unfavorable results, even by the most radical methods; and, on the other hand, even by the simplest method, either the Krause, or the method through the middle meatus, the most kindly results have been obtained, even in the most chronic cases, without the radical operation—either the Caldwell-Luc or Denker. But where the simpler intranasal operations are not sufficient, the Denker or modified Denker or Caldwell-Luc opeeation is needed to reveal the pathology.

Dr. Otto J. Stein said that his experience has led him to feel now that he cares less and less to perform all of the radical operations mentioned. He feels that some of the minor operative measures of making large openings through the nose, either below or above the inferior turbinate, have saved many of his patients from a more radical procedure. He did not care to enter into the discussion of the choice of these various operations, however. That rests a good deal, as had been stated, upon the pathology and individuality of the operator, and probably the thoroughness with which the operation is performed.

Dr. Marquis, closing the discussion, thought the members were pretty much agreed as to the general points that he tried to bring out in his paper. He thought, however, he had been a little bit misunderstood by Dr. Shambaugh and Dr. Andrews, when they spoke of trying the simpler operations first. Dr. Stein also, he feared, misunderstood him on this point. He did not intend to convey the opinion that every case of suppuration that came into his office, in his opinion, should have the Denker operation performed. Far from it. It is only in cases of last resort. He tries a simpler method first. A great majority of the cases will get well with simple washings, although Dr. Andrews does not believe in them. Dr. Marquis has seen a great many get well in that way. He does not care how the pus is removed, either by washing or compressed air, a great majority will get well if the pus is gotten out and drainage established. It is the rarest exception that we have to perform a radical operation, but the object of the paper was to bring out in those cases, where the simpler method did not suffice, the radical operation of preference. These patients, when radical operation is required, should be given the benefit of that one which will give them the greatest probability of a cure, and allows the operator to control the field of operation, under supervision.

Dr. Pierce has thought that the Luc-Caldwell gives a better field of operation because it takes away the anterior wall, while the Denker only takes away the nasal wall and the opening around the pyriform aperture. The very object of the Denker operation is that you can carry that opening just as far as you want, clear back to the molar teeth, if necessary. You can take the entire anterior wall off, if you want, and get an opening which brings it out in front of you. We all know that we have had trouble in these cases that do not get well because of some little focus in the anterior angle, and that is bound to stay in a Luc-Caldwell operation. But in the Denker operation there is no question but that you have every part of it under observation.

As to the question of removal of the entire membrane, the speaker did not want to be understood as doing that. There, again, is the very object of the Denker operation, because it allows the operator to see what membrane to remove, and what to leave. He is not working in the dark. The object of this operation is that you can work under the control of the eye, and see which parts you want to remove and which should be allowed to remain. That, he thinks, is one of the strong points of the Denker operation.

As to the flap: As he said in his paper, he was opposed to it; he has been converted, and hopes others will be. He has better results in healing with his present method.

Denker only insists on the removal of the membrane of the floor, and the healing of the flap will take place. Only the diseased membrane is removed.

Regarding packing, he read an article in a journal a short time ago—a discussion from Uffenorde, Hajek and Onodi—on the subject of nasal packing following operation, and they all said they did not believe in packing and did not practice it. He has been with all of those men and never saw them operate a case without packing. They all do it. He did not mean that the gentlemen present used packing, but there is a great deal of talk about not packing in the nose, and then a great many men do it afterwards. Personally, he believes, with Dr. Robertson, that if one is going to use a flap, a carefully applied dressing to retain the flap in position and at the same time promote drainage (don't call it a pack), will promote healing. So far as the rest of the points of the operation are concerned, he thinks they are all agreed.

ABSTRACTS FROM CURRENT LITERATURE.

I.—EAR.

Radium in Middle Ear Deafness Caused by Chronic Suppuration.

BRYANT (*New York Medical Journal*, July 4, 1914). The patient was a woman aged fifty-four years, who had been operated upon for recurring mastoiditis and chronic middle ear suppuration. She complained of loud and persistent tinnitus. The hearing was lost in the left ear and greatly reduced in the right. Radium was applied at intervals of five or six days (presumably three applications in all). Five milligrams of mesothorium bromid were used.

After the first application the tinnitus was relieved. After the last application it stopped and has never returned. The patient hears the voice now proportionately well. Her intellect is clear, and "from a person almost totally deaf, inaccessible and indifferent, she became observant and responsive."

Harris.

The Physiologic Treatment of Catarrhal Deafness.

ALBERT C. GEYSER (*New York Medical Journal*, July 11, 1914) states that at a recent meeting in New York he presented a series of cases suffering from "chronic nose catarrh," who had been deaf for from five to fifteen years, where previous treatment had been employed without effect, and where by the treatment which he recommends he had been able to very materially improve the hearing.

The treatment is based upon the physiology and pathology of the tissues involved. It consists of an irrigation of the nose with an alkalin solution, followed by an oily spray of iodin where atrophy is present, one of acetozone if hypertrophy is present. "The iodin irritates and stimulates tissue increase, and is a good germicide. The acetozone is a sedative to the mucous membrane, at the same time germicidal, antiseptic, anodyn, emollient." This preparatory treatment is followed by the use of high frequency currents for the atrophic cases, for the purpose of stimulating, and for the hypertrophy the

diathermic current, which contracts. Where the nose is so obstructed that the electrodes cannot enter, electrolysis needles are employed. Anchylosis of the ossicles is treated by dry heat and passive motion. The external canal is freed from all effects by an alkalin irrigation, and then with the patient in a recumbent position the ear is filled with a warm alkalin solution. A piece of rubber tubing is introduced, almost to the ear drum. The negative pole of the galvanic current is placed into this rubber tube. The positive pole is placed on the nape of the neck. The eustachian tube will rarely require any treatment. Where it does, electrolysis is to be employed. Following this treatment, "patient, who could not hear an alarm clock tick one inch from the external meatus, frequently can hear a watch tick six to twelve inches from the affected ear." *Harris.*

Otitic Paralysis of the External Oculomotor Associated With Involvement of the Trigeminal.

GIGNOUX (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* February 7, 1914). The syndrome of paralysis of the oculomotor external, associated with ear trouble, which was first pointed out by Gradenigo, is now well known. The exact pathology, however, is still in doubt. Two theories are most in favor to explain it: the one that the paralysis is of a simple reflex character, the other that it is the result of a propagation of an infected area toward the intracranial cavity, producing either a neuritis of inflammatory or toxic origin, or especially a lesion of the meninges or sinus. Gradenigo has come now to feel that in every case there is an ostitis at the apex of the pyramid with an adjacent pachymeningitis. The author feels that the paralysis affection presents so many different clinical pictures, it is impossible to ascribe the same pathology in every case.

Gradenigo divides the cases into three groups. The first represents typical cases where the three characteristic symptoms are present—namely, acute otitis, paralysis of the sixth nerve and severe frontocoryzal pain. In the second group the three symptoms are associated with accessory symptoms, such as irritation of the third nerve, meningeal pneumonia, or otitic complications. The third group represents cases complicated

with acute leptomeningitis, which terminate fatally. Recovery is usual in the cases of the first and second group.

According to Gradenigo, the infection proceeds from the middle ear to the apex of the pyramid, through the pneumatic cells around the tube and carotid. In the first group the lesion often remains extradural. In the second and third group the inflammatory phenomena are most extended and involve the adjacent nerves. The author has recently had a case under his care, of a child of nine suffering from double otitis the result of measles. The onset of the otitis was marked by elevated temperature, severe pain and phenomena suggesting meningitis, stiffness of the neck and Kernig. The day after he saw him, while the general condition had improved, there developed severe pain in the frontoparietal region of a paroxysmal nature. The diagnosis was made of circumscribed meningitis. Shortly after, oculomotor paralysis developed. The child continued to improve and made an uneventful recovery. A hypoesthesia, well pronounced, developed in the left suborbital region, indicating an involvement of the trigeminal. Baldenweek explains the associated involvement of the trigeminal by a bony lesion at the apex of the pyramid.

In eleven cases collected by this author, four have terminated fatally. The autopsies have borne out his view of the location of the lesion. He is inclined to put a most grave prognosis where the involvement of both nerves exist, and is of the opinion that it calls for immediate operation.

It is Gignoux's feeling that his case tends to disprove the position of Baldenweek, and points to a benign meningitis as the cause rather than a disease of the bone. This and other cases strengthen him in his opinion that there is no one pathogenesis for all cases. On account of the difficulty of determining exactly what is the cause in a given case, the prognosis cannot help being uncertain and the decision as regards operative procedure difficult. *Harris.*

Local Anesthesia for Operations Upon the Ear.

ARNAL (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, March 14, 1914). After giving the history of its development and the anatomy of the parts involved, the author describes the various procedures which have been employed, including the mixture of Bonin, the method of von

Eichem, and that originally proposed by Neumann, as well as the modification which bears his name, and that of Gaugier, which consists in the introduction of a needle no longer through the canal but through the retroauricular groove.

Of the various drugs employed the author is in favor of cocain because of its more certain action.

His experience makes him a strong advocate of local anesthesia, but he recognizes that it has its limitations, first because of the dangerous affections of cocain in certain individuals, second the difficulties of injection in certain regions, and third the unsatisfactory results occasionally met with. Novocain is less active and seven times less toxic than cocain.

Harris.

Immediate Closure After Antrotomy in Acute Mastoiditis.

MOURE (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, May 2, 1914). A communication from the pen of such a master as Moure on this much mooted question is most welcome. His operative experience is so large that any opinion he may express is bound to carry great weight. His conclusions are based upon thirteen hundred and eighty operations, of which seven hundred and twenty-three were radicals and six hundred and fifty-seven simple mastoids. He gives a résume of the different methods of treating the mastoid wound after operation, and then proceeds to divide his cases clinically into four groups.

The first group represents cases of acute osteomyelitis where the mastoid cavity shows red and bleeding cells isolated completely from one another, and filled with an oily fluid, not seropurulent. He regards these cases as decidedly grave and very infectious.

The second group represents the ordinary mastoid, filled with pus, where all the bony partitions have been destroyed.

In the third group the mastoid is filled with reddish granulations, bleeding easily. Here, also, the bony walls have been destroyed, including the cranial barrier, and resembles, in fact, an extradural abscess.

The fourth group represents cases of mastoid osteoperiostitis on the point of the opening. The inner and external tables are both thin, and the mastoid is reduced to a large fungating and suppurating cavity. These cases, in his opinion, are not particularly serious.

As a result of his long experience and observation, Moure is of the opinion that in the majority of cases of acute mastoiditis, the proper procedure is, after thorough and complete removal of all the disease, to immediately close the mastoid wound with the exception of a small opening for a drain, which can later be removed. This latter procedure he advises because of the fact that usually, even after the most complete operation, there is a slight serous discharge.

Harris.

Dressings Consecutive to the Mastoid Operation.

WEISSMANN (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* May 9, 1914). In this careful review of the various methods of dressing the mastoid wound following a simple or radical operation, the author favors the immediate closure without drain. He recognizes no risks in the method, and sees for it a healing much more rapid, occasions no pain and has a much more elegant result. He favors the same procedure following the radical operation, putting no packing through the auditory canal. He recognizes, with most aurists, that at the best, epidermization may be unsatisfactory or of poor quality, and urges the inspection of the wound at stated intervals.

Only in cases with endocranial or labyrinthine complications should the wound be packed from behind. He admits that he is a pioneer in omitting all dressing, but claims that in the cases where he has pursued this method, the results have been entirely satisfactory. *Harris.*

The Diathermo-Kinesiphone, or Auditory Reeducation, in Connection With Heat.

MAURICE (*Revue Hebdomadaire de Laryngologie, d'Otolodie et de Rhinologie,* May 16, 1914). The diatherm is a method of application of currents of high frequency capable of passing through the body without producing contractions, pain, or electrical effects, but which elevate the temperature. It has not been generally employed therapeutically, largely because the waves produced were so intermittent.

Maurice has devised an apparatus which obviates this difficulty and has recently employed it in connection with his kinesiphone. In cases where the kinesiphone has failed to

produce the desired result, the combination with the diatherm has been most encouraging. The mixed treatment is to be used for the two symptoms of deafness and tinnitus. In cases where the kinesiphone has failed to relieve the tinnitus in twelve or fifteen treatments, the combined method has achieved the desired result. The author has not yet employed it for aural vertigo.

Cases of otosclerosis will not be benefited by the treatment, but in subjective tinnitus and neuralgic phenomena accompanying serootitis and subacute otitis, and chronic middle ear otitis, he recommends that it should always be employed. The indications are less numerous than for reeducation, but in the author's hands results have been twice as good as those obtained by reeducation alone. *Harris.*

Circumscribed External Otitis Simulating Mastoiditis.

POTELLA (*Archives Internationales,* May-June, 1914, p. 776) distinguishes between furunculosis of the canal and circumscribed external otitis. In furunculosis the infection is limited to a follicle which is surrounded by a zone of inflammation. The pain is usually limited, and ordinarily there is no edema of the surrounding tissues. When ripe the furuncle will break, even under the introduction of a speculum. Furunculosis is often the result of a constitutional disease. External otitis, on the other hand, usually depends upon an infection, the result of some abrasion, as from the finger nail. Here there is no definite limitation to the inflammation, which continues to extend until the retroauricular groove is obliterated and the clinical picture becomes one simulating mastoiditis. A true abscess develops and can be detected in the retroauricular region, and with more difficulty in the wall of the canal, which is reddened but does not give any pain.

The author argues that the two pictures are so separate that the distinction is not a theoretical one. In one case the cause should be sought outside the ear, in the latter case in some local condition in the canal giving rise to scratching. He reports two illustrative cases, showing the similarity to mastoiditis, and makes the following differential diagnosis:

External otitis: First, intact drum. Second, very severe pain when the lobe of the ear is displaced. Third, tumefac-

tion of the anterior, posterior or lower wall of the canal, diminishing towards the drum.

Mastoiditis: First, perforation of the drum, pain on pressure over the antrum. Second, tumefaction of the posterior superior wall, which increases on approaching the drum.

Treatment consists in opening the abscess. In the case of furunculosis the incision should be made from within outwards, but in a circumscribed external otitis, externally inwards. The focus of suppuration is apt to be deep seated. Local anesthesia usually proves unsatisfactory, and general anesthesia (the author recommends somnoform) is to be preferred. *Harris.*

The Therapeutic Action of Adrenalin in Diseases of the Ear.

GOLDMAN (*Archiv. für Ohrenheilkunde,* December 22, 1913) states that an adrenalin spray in the epipharynx or a solution of adrenalin applied directly to the ostium of the eustachian tube will sometimes produce an immediate improvement of hearing, and a lessening of the subjective noises, even of long duration, in cases of chronic and acute tubal catarrh, and also in cases of otitis media that show a tendency to get better anyway. *Theisen.*

Two Fatal Cases of Otogenous Diffuse Leptomeningitis With No Bacteria in the Fluid Obtained by Lumbar Puncture.

HOLGER MYGIND (*Archiv. für Ohrenheilkunde,* December 22, 1913). First case: Man, aged twenty-five years, with a chronic right suppurative otitis media and cerebral symptoms. There were no meningeal symptoms. The fluid obtained by lumbar puncture was cloudy, with many polynuclear cells but no bacteria. A radical mastoid and labyrinth operation was performed. Six days later meningeal symptoms and coma developed. Spinal fluid at this time was only slightly cloudy. An exploratory operation failed to reveal a cerebral abscess, but a cerebellar abscess was found. At autopsy two other cerebellar abscesses were found, with a diffuse suppurative leptomeningitis. Diplococci were found in the abscess pus.

The second case was that of a young man aged twenty-two years, who was brought to the hospital in a somnolent con-

dition. Caloric reaction was negative. Kernig and rigidity of the neck present. Lumbar puncture gave slightly milky fluid with many polynuclear cells but no bacteria. At operation a circumscribed pachymeningitis externa was found. Patient died two days later. Autopsy revealed a severe diffuse purulent meningitis with a localized external and internal pachymeningitis. In this case the spinal fluid was still free from bacteria five hours before death. *Theisen.*

II.—NOSE.

Why is Nasal Catarrh so Prevalent in the United States?

WOLFF FREUDENTHAL (*New York Medical Journal*, January 3, 1914) reverts to a subject to which he has given a good deal of thought and presented in previous communications. While he recognizes that a certain number of cases of nasal catarrh are infectious, he believes the great majority are of idiopathic origin.

He accepts Bosworth's position that in catarrh the amount of serum secreted by the nose is diminished, and in consequence there is a failure of proper mixture of the mucous secretion with failure of the mucus to pass off. He believes, however, that this is not due to hypertrophy of the mucous membrane, but to our present mode of living.

He places the largest emphasis upon the overheating in our modern apartments and tenement houses, with the pronounced diminution thereby of the humidity of the air. The average New York house in winter has not more than thirty to thirty-five per cent humidity. Even in our best hospitals there is a pronounced difference between the humidity of the air in the wards and that in the air outside. The dryer the air we inhale, the more moisture will be given off by the nose and the nasopharynx. The work of these organs will be so much greater with every particle of air we inhale. In consequence, a dry rhinitis and rhinopharyngitis develops.

Next to the lack of humidity in the air is to be mentioned the dust which is so widely found in our American cities and towns. As a means of preventing colds, and in that way catarrh, Freudenthal urges:

First, in order to lessen the great prevalence of catarrh,

our systems of heating should be changed so as to allow much more moisture to evaporate in each living room. That is especially important in schools or meeting halls, churches, theaters, concert or lecture rooms, and assembly rooms of every kind. A pail of water in front of the heater is ineffective. We have to employ other means in order to overcome the deficient humidity indoors.

Second, in order to prevent colds we have to limit the amount of garments worn.

Third, exposure to draughts, rain, snow, and all inclemencies of the weather ought to be practiced by the youth, in order to prevent the most preventable of all diseases—colds.

Harris.

The Choice of Operation Upon the Accessory Sinuses.

MOURE (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, April 4, 1914) is not in favor of the intranasal operation upon the antrum, because of the liability of its incompleteness. He favors the Caldwell-Luc. Also, he is not in favor of the extensive operation upon the frontal sinus recommended by Killian, and insists that all that is necessary is a sufficient removal of the anterior wall to admit of complete removal of the mucous membrane. If this is done and the adjacent ethmoid cells are thoroughly cleaned out, the case is bound to get well.

The intranasal operation upon the frontal sinus is not recommended because of the liability of reinfection from the nose, even after a complete cure. The author is of the opinion that all operations upon the frontal sinus properly executed will be followed by complete occlusion of the cavity. On that account, a wide open nasal frontal canal has no advantage. He describes the experiments of a Russian colleague, Ssamoylonka, upon a series of cats and dogs. The sinuses were opened and the mucous membrane entirely removed. The animals were killed at varying periods of from one to six months. In every case when the sinus was exposed postmortem, the periosteum was found to have increased in size and a cicatricial fibrous tissue had developed which in six months or sooner completely occluded the cavity. Reasoning that the bone in animal and man is the same, the conclusion was drawn that of necessity this must be the result in the human being.

Moure himself has had occasion to open the frontal sinus in certain cases after operation, and has found the cavity entirely obliterated. The operation upon the frontal sinus completed, he introduces a tampon through the nose, and the wound is packed with iodoform gauze, the lower end of which is allowed to come out of the nose. This is removed in four or five days. The upper end of the packing rests at the internal angle of the incision in the skin. A drain is left in for from five to six weeks. *Harris.*

Angioma of the Ala of the Nose.

RENE-CELLES (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* April 11, 1914) reports two cases which, with one other described by Broca, are the only cases on record of angioma occurring in this locality. He does not include in his consideration of the subject angioma of the septum or of the turbinate. The growth is insidious in its onset, and presents itself as a sessile mass, reddish in color, covered with blood vessels lying anterior to the inferior turbinate, which it hides. The two chief symptoms are obstruction to breathing and a reddish discoloration of the nose externally.

He recommends thermocautery and excision as the best methods of treatment to be employed. *Harris.*

Neuralgia and Migraine of Nasal and Otitic Origin.

RAOULE (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* April 18, 1914). Neuralgic pains in the nose and ear are wont to be met with in disease involving the nose and ear. Mounier and Trepau have both described cases. They usually occur in two groups of cases, the first where there is a hyperesthesia of the mucous membrane of the nose, the result of a digestive or menstrual trouble, or of colds associated with migraine, pain in the eye, tickling in the throat and in the ear. Here there is a sensitiveness of the nasomucous membrane or nasomucosa to the touch of the probe, and an injection of the drum membrane more or less marked, with tinnitus and slight deafness. In this group of cases, according to the author, there is no question but that we are dealing with slight congestive disorders involving the nasal, pharyn-

geal and tympanic mucous membrane, in conjunction with marked irritation of the sympathetic. The second group of cases represent the violent pains which occur in the frontal region and in the ear in acute coryza, simulating a sinusitis or a severe catarrh of the middle ear, in patients already suffering from chronic nasopharyngitis. These symptoms return at intervals, but with all the signs of an inflammatory involvement. Here a catarrh of the middle ear is recognizable. With the pain is wont to be found deafness and tinnitus.

In both groups of cases there is a congestive or inflammatory element, together with a nervous reflex involving the sympathetic system. In the second group the inflammatory element is the more important.

Nasal treatment is wont to cause the painful sensations to disappear. The symptoms in ear often, however, persist in spite of treatment, and the deafness and tinnitus, at first intermittent, become permanent. For this group of cases the catheter gives no benefit. The author has, however, secured prompt results from the use of electricity. *Harris.*

Reorganization of the Septum After the Submucous Resection.

MERMOID (*Archives Internationales*, May-June, 1914, p. 17) reports a case of a man aged forty-five years who had been operated upon two years before for a resection of the cartilaginous septum. The patient required further operative work. On making an incision, no trace of cartilaginous tissue was found. In view of this, he regards it entirely useless to attempt to preserve the perichondrium and the periosetum with a view to the reformation of cartilage or bone. He recognizes, however, that these membranes are desirable in order to strengthen the new septum. *Harris.*

A Case of Pseudotumor of the Orbit.

RUTTIN (*Wiener medicinische Wochenschrift*, No. 1, 1914) reports a case in which for four weeks there had been swelling of the lids followed by a rapidly developing exophthalmos of the left eye. The eyeball was displaced downward and forward, the up and down movements being very much interfered with. A little later a firm mass could be felt just under the upper orbital ridge. The Wassermann and tuberculin reactions were negative.

Examination of the nose showed a swelling of the lower turbinate. This was removed, but no suppurative process in the accessory sinuses could be determined. A piece of the mass was then removed for microscopic examination, and this showed simply inflammatory changes with no definite findings. An energetic treatment by mercurial inunctions was followed by a disappearance of the tumor and the exophthalmos. The movements of the eye became normal. *Theisen.*

Accidents Following Puncture of the Antrum.

KILLIAN (*Verhand. Verein Deut. Laryn.*, 1913, p. 217) has added to the already large list of unfortunate and fatal accidents following the ordinary washing of the antrum several new observations. In a number of cases he has observed, a few hours following the washing, a sudden chill followed by a temperature of thirty-seven degrees. In three hours the temperature is again normal. A satisfactory explanation is difficult. It is probably due to a stirring up of fever producing organisms, which up to the time of the washing had remained quiescent and were awakened into activity by the washing.

In another case the patient suddenly became blind in one eye. In fifteen minutes the sight began to return, and recovery followed in a few days. The attack was accompanied by a chill and fever. The ophthalmologist was inclined to credit the blindness to a small embolus in the central artery, but Killian believes that the matter could be explained by reflex contraction of the vessels.

In a third case, where Killian had noted that a slight feeling of faintness had followed a washing, he had decided not to repeat the procedure, but the washing was carried out by an assistant, who was unaware of this fact. The patient suddenly died, and the autopsy showed nothing to explain the death. It was found that the water used in the washing was slightly cold. Death was probably due to a reflex from the vagus. *Horn.*

The Secretion in True Ozena.

AXISA (*Monatschr. f. Ohrenheilkunde*, Vol. 6, 1914), taking as the basis of his thesis the work of Ründstrom on the etiology of ethmoiditis exulcerans, after a study of twenty-one

cases of true ozena, concludes that this disease is caused primarily from a diseased condition of the ethmoids and sphenoids. Of the bacteriology of the disease he has nothing to say; but his careful observations on the manner in which the pus is formed, as studied from hour to hour, his brilliant results after a thorough cleaning out of the ethmoids and sphenoids, are worthy of very careful study and thought.

The secretion which forms on the septum and turbinates is always free from odor and does not lead to the formation of the real ozena crusts. These latter are formed solely from the secretion of the diseased cells. His studies were made in Egypt, where cases of ozena are very common. He selected for observation twenty-one cases, in which fourteen were completely healed after thoroughly cleaning out the ethmoids and sphenoids. Eight cases were very much improved. The treatment covered a period of six to eight months, and consisted, after the operative work, in painting the surfaces daily with a silver solution (strength not given) and packing the nose with mentholated oil.

He concludes:

1. The ordinary superficial secretion of ozena is of a purely secondary nature.

2. The crusts which are formed from the secretion of the mucous membrane of the nose have nothing in common with the true crusts of ozena.

3. Ozena crusts are formed exclusively from secretion derived from the diseased ethmoids and sphenoids. They are formed first in the accessory cavities themselves, and then push out as extensions into the nose.

4. Real crusts which form at the lower border of the middle turbinate are derived from secretion which drops out of the cells. *Horn.*

III.—PHARYNX.

The Results of Tonsil Operations on Public School Children in New York City.

GERHARD HUTCHISON COCKS (*New York Medical Journal*, January 17, 1914) has examined one hundred and seven children referred to him by the school doctor for operation. The object of this investigation was twofold: "First, to obtain information which would warrant a request for more funds

from the board of estimate for the care of adenoid and tonsil cases in the municipal hospitals; second, to ascertain whether any improvement could be made in the methods employed in the schools for the disposition and treatment of these cases."

As a result of this investigation, he makes the following observations:

1. Of one hundred and seven children examined, eighteen, or approximately sixteen per cent, failed to have the operations performed.

2. Of eighty-nine cases operated on, nine, or approximately ten per cent, received mutilations of the soft parts adjoining the tonsils.

3. Of twenty-one cases operated on without general anesthesia, nineteen, or over ninety per cent, were badly done.

4. Of fifty-two cases operated on with general anesthesia, twelve, or twenty-five per cent, were poorly done.

5. If we add the number of cases receiving mutilations to the number of cases badly operated on, both with and without general anesthesia, we have 26.9 per cent poorly done. In addition, there were thirty-one children who required further treatment for nasal conditions. It is, therefore, clear that the system now employed, notwithstanding its usefulness, can be materially improved.

He draws the following conclusions:

1. A greater number of medical inspectors are needed.

2. School physicians and nurses should exercise more care in seeing that children referred for operation carry out their recommendations.

3. When children are referred to hospitals or clinics they should be sent to institutions which maintain nose and throat departments. This is to avoid attacking the tonsils when the anterior nares are at fault.

4. Hospital physicians would do well to remember that a child, referred with a card from the school physician, is often sent simply for diagnosis and treatment. Such a card is not an indication that an adenoid and tonsil operation is imperative or even advisable. The hospital physician should carefully examine and decide each case on its own merits. The mere presence of a pair of healthy tonsils in the child's throat does not necessitate operation. There should be some good indication, viz., mouth breathing, recurring attacks of earache

or tonsillitis, deficient physical or mental development, etc. If operation is contraindicated, the doctor should always note this fact, together with the diagnosis and treatment, on the card provided for this purpose by the school authorities.

5. All adenoid and tonsil operations on children should be done under general anesthesia.

6. Hospitals where adenoid and tonsil operations are performed should be equipped to keep their patients in the wards for at least eighteen to twenty-four hours after operation.

Harris.

A Case of Vincent's Angina Occurring in the Lingual Tonsil Alone.

GESEZ (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* March 28, 1914). With the exception of a case reported by Moure in 1909, the author's case is the only one on record where the lingual tonsil was alone involved. The patient was a woman of fifty-two years, where the disease gave general and local symptoms of an alarming type. The lingual tonsil was found covered with a whitish deposit giving the appearance of a pseudomembrane. There was a general hyperplasia. On the left side an area of ulceration could be detected. Digital examination could detect no difference in the two sides at the base of the tongue. It caused a slight amount of pain. Bacteriologic examination of the smear showed the characteristic fusiform bacilli and spirilla.

Under a treatment of milk, eggs, vichy water, chlorid of potash, with irrigation of the mouth with peroxid of hydrogen, a prompt and rapid recovery took place. The author dwells upon the differential diagnosis, especially from diphtheria of the locality involved, and of the importance of the bacteriologic examination *Harris.*

Malignant Tumors of the Pharynx in Infants.

JEANNERET (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* April 18, 1914) reports a case of carcinoma of the pharyngeal tonsil in a child of six years, and a case of round cell sarcoma of the pharyngeal wall in an infant of six weeks. He has been able to find in the literature only fourteen cases of primary malignant growth in infants. He concludes, very properly, then, that they are exceedingly rare.

The tonsils are most usually the locality to be involved;

less frequently, the soft palate, and exceptionally, the pharyngeal wall. Sarcoma of an infantile type is most frequently met with. Carcinoma is exceptional.

The case of sarcoma reported by the author is regarded by him as congenital, and shows that the pharynx can give rise to a malignant growth apart from any factor of irritation, bearing out the theory of Cohnheim, that there may be an overproduction of cells designed for a particular organ, so that the surplus go to form a new growth. All tumors of the pharynx in infants have a very rapid growth and the prognosis is absolutely bad. *Harris.*

Epithelioma of the Palatine Recesses.

ESCAT (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, July 11, 1914). Epithelioma of the palatine recesses is more usually known by us as of the supratonsillar fossa. Escat, after describing the anatomy of this, reports three cases of epithelioma of the region which have passed under his eye. From the study of these and other cases he describes epithelioma in this region as falling into one of two classes, the first being the endopalatine form, which is characterized by a development outside of the pharynx. This may take the form of a tumor of the neck, and the first symptom referable to the throat is either a cervical adenitis or a hemorrhage from the supratonsillar fossa, or an attack of angina. The second class is the form developing within the mouth and giving symptoms suggesting a gumma.

[The reporter has had under observation while reading this article a case falling under the first class—that is, a cervical adenitis, presenting itself because of angina. A peritonsillar abscess was diagnosed and opened, with the escape of pus. Later a new growth was discovered and found upon examination to be an epithelioma.] *Harris.*

IV.—LARYNX.

Prelaryngeal Tubercular Adenitis.

LIEBAULT (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie*, January 3, 1914) reports three cases that have been under his care. The glands are situated on the

cricothyroid membrane. Sometimes the adenitis is accompanied by an endolaryngeal tuberculosis, and at times the larynx is free. The symptoms are those of tubercular adenitis elsewhere. The diagnosis offers no difficulties.

Treatment is either medical or surgical. The author recommends the injection of thymol 100, camphor 200, into the diseased gland. This treatment in one of his cases achieved a complete cure. *Harris.*

Local Heliotherapy in the Treatment of Laryngeal Tuberculosis.

SARI (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* January 10, 1914) in his treatment of tubercular cases at Nice has used for a number of years sun rays. His method is very simple, consisting merely of the employment of a laryngeal mirror which is held in place for from twenty to thirty minutes twice a day. He gives a number of clinical reports where he has employed the method to advantage, and states in conclusion that he has observed cases with benefit to the ulcerated area. It has aided in the spontaneous elimination of tubercular granulation, and in all his cases has served to relieve pain and often causes its complete disappearance. In a word, the procedure is indicated because of its analgesic, dicongestating and bactericidal qualities.

Harris.

Resection of the Superior Laryngeal Nerve in Dysphagia of Tuberculosis.

HENRI ABOULKER (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* May 30, 1914). In certain cases the treatment of the nerve with alcohol does not give lasting results. For this or other reasons, the author recommends resection of the nerve. He has practiced the method in two cases. In the first, the result was all that could be desired. In the second case a bilateral resection was made. This was followed by progressive dyspnea, tracheotomy and death.

The method employed is that of an incision midway between the hyoid and thyroid, extending to the sternomastoid. A dissection with a grooved director is made until the laryngeal artery and vein are encountered. The nerve will be found above and on a plane deeper than these vessels. At times the capsule of the submaxillary gland will have to be raised.

One centimeter of the nerve is resected. The operation is to be done under local anesthesia. In the first case the dyspnea disappeared immediately after the operation. *Harris.*

Indications and Technic of Laryngectomy for Cancer.

LOMBARD (*Revue Hebdomadaire de Laryngologie, d'Otologie et de Rhinologie,* June 13, 1914). The postoperative mortality in laryngectomy has been considerably lessened in recent years. This is due, first, to the improved surgical methods upon the upper respiratory tract; second, to the extreme care with which the operation is carried out; third, to the combination of local and general anesthesia or the entire suppression of the latter in certain cases; fourth, to the importance given to the preparation of the patient and to the minute care after operation.

Controlling results have been carried out by the Spanish school. The remarkable results of Glück are due to the minuteness in details and the perfection exercised in the execution of each of them. The author favors local anesthesia, in spite of certain objections, such as that at times it will not last sufficiently long for the operation and that adrenalin solutions predispose to a late hemorrhage or a hematoma. The carrying out of the operation in two stages has advantages as well as disadvantages, which are recognized by even those who have performed it. One merit is that it allows the testing of the endurance of the patient.

The article is accompanied by statistics up to 1911. These show in two hundred cases performed by Botey a mortality of seventeen per cent, recurrences of fifty-two per cent, healing after three years of twenty per cent, patients lost sight of after operation of eleven per cent. The statistics of Glück are incomplete, but show one mortality in a series of eighty-four cases. *Harris.*

Laryngeal Phthisis and Pregnancy—The Actual Status of the Question.

IMHOFEN (*Archives Internationales,* May-June, 1914, p. 717). Speaking from a large experience as an obstetrician, after dwelling upon the importance of a careful getting together of laryngologist and accoucheur, Imhofen is of the opinion that pregnancy as a complication of tuberculosis of

the larynx is exceedingly rare. In over nine thousand confinements he has seen only eleven cases. Neither clinically nor microscopically can it be shown that the pregnant woman is more predisposed to laryngeal phthisis. At the same time his anatomic and pathologic studies explain the subacute course of tuberculosis of the larynx during pregnancy.

Pregnancy renders the prognosis of tuberculosis of the larynx very grave, the mortality varying from eighty-six to ninety per cent. The confinement can give rise to a state of edema in the lesions in the throat or even produce dyspnea.

As regards treatment, it is his opinion that if a pregnant woman suffering from laryngeal tuberculosis presents herself for treatment in the first five months of her pregnancy, an artificial abortion with castration is to be advised. The course of treatment is quite different if she presents herself at an advanced stage of her pregnancy, where the laryngitis is apparently inactive, or if the patient comes only at a time when she needs attention. In either case the confinement should be allowed to proceed without artificial means. The results of bringing on labor are deplorable. Almost without question the result is fatal. As concerns the infant, the statistics are not brilliant, from thirty to forty per cent only of the children survive. Nevertheless, the prognosis is less somber than for the mother.

The fatal evolution of the lesions of the larynx is due to the histologic peculiarities of the diseased mucous membrane. On this account the treatment should be very conservative. If curative tracheotomy is indicated, it should be carried out. In none of the author's cases has it been necessary, however. Preventive tracheotomy, because of an eventual dyspnea during confinement, is another question. The author does not recommend it. The dyspnea is never sufficient, in his experience, to require it. *Harris.*

Case of Spontaneous Healing of Cancer of the Larynx.

PUGNAT (*Archives Internationales,* May-June, p. 761). The patient was a man of sixty years, who had suffered for a number of years from the presence of an oval reddish growth the size of a bean, which occupied the entire left arytenoid region, extending above the left cord, which was entirely concealed. The right arytenoid was entirely normal. No ulceration of

the growth was present. Palpation showed a large lump in the submaxillary region on the left side, the size of a nut and hard in consistency.

A clinical diagnosis of a malignant growth of the larynx was confirmed by a microscopic examination of a section removed. Surgical interference was refused. Solution of adrenalin was prescribed, to be administered with a laryngeal syringe. Some weeks afterward the patient was seen, and the growth was noticeably diminished. The voice became almost normal. The anterior two-thirds of the left cord became visible. Four months later the tumor was reduced to half its size. At the end of the fifth month no more hoarseness existed. At the end of the sixth month the larynx was entirely normal, not a trace of the growth could be discovered. The cachexia present in the patient disappeared.

A year later the patient presented himself because of the appearance of a growth beneath the left maxilla. This was found to be an enlargement of the mass in that locality noted at the time of the original visit. The larynx was perfectly normal. The tumor grew rapidly in the neck, causing trouble with circulation. Cachexia presented itself, and two months later the patient died, the result of hemorrhage from the carotid.

The author refers to a book by Powers on "Vanishing Tumors," where a number of similar cases are described.

Harris.

Papillomata of the Larynx in Children.

CHIARI (*Wiener medicinische Wochenschrift,* No. 39, 1913). The writer's paper is largely statistical, and some interesting facts in regard to the frequency of laryngeal papillomata in children, and the results of different methods of treatment, are brought out.

V. Bruns, up to 1878, had collected forty cases that had been treated intralaryngeally only, with thirty cures, three partial cures and five recurrences, while in two cases the result of the treatment was not known.

After the introduction of cocain the endolaryngeal operations for the removal of papillomata increased very greatly.

Between 1879 and 1896, Rosenberg gives the records of forty-eight cases, the majority of the operations having been performed under cocain anesthesia. Thirty-one cases were

cured, and six improved. There were seven doubtful results, one recurrence and three deaths.

Of twenty-three cases from Chiari's clinic in Vienna, tracheotomy was performed in ten with one death, two recurrences and six cures, after endolaryngeal methods employed later. One case was not cured.

Thyrotomy should be performed only in the worst cases.

Rosenberg arrived at the following conclusions in this respect: The operation is particularly dangerous during the first four years of life, over thirteen per cent of the operations resulting fatally; hoarseness, because of injury to the vocal cords, frequently follows; permanent strictures may result and recurrences after thyrotomy are frequent. He quotes Austin, who performed thyrotomy seventeen times on the same child for recurring papillomata.

The author comes to the following conclusions: Intralaryngeal operations under cocain anesthesia should be first attempted, particularly in older children. If the indirect methods fail, direct laryngoscopy under general anesthesia should be employed. When extreme difficulty in breathing develops, tracheotomy should be performed, and later, with the canula in place, operations may be performed by either the direct or indirect methods. *Theisen.*

V.—MISCELLANEOUS.

Quinin and Urea Hydrochlorid in Nose and Throat Surgery.

ARTHUR J. HERZIG (*New York Medical Journal,* March 14, 1914) has employed quinin and urea hydrochlorid in three hundred and ninety cases. His technic is as follows:

"I use a four per cent solution of urea and quinin, mixed with boric acid, to prevent fermentation, in the proportion of one to one hundred, after instructions to clear bowels the day previous to operation and no meal four hours before operation. I now have my patient, if a child, prepared in a morning dressing; if an adult, prepared simply with sterile towels and gown. I inject ten minims into the anterior pillar of the fauces, high up, where one would incise a peritonsillar abscess, and ten minims, low down, in the posterior pillar of the fauces. This latter part of the injection cannot always be done where there are very large tonsils present. In fact, one-

half of my cases have only one injection made, namely, in the anterior pillar. No pain is experienced in the single injection method. For the adenoids I use a fifty per cent solution prepared in the same way, but only swab this on with a postnasal applicator. The anesthesia here is nearly as complete as that of the injection. I now have my patient wait from ten to fifteen minutes. I then proceed to perform my tonsillar resection and removal of adenoid tissue, as if any other anesthetic had been used."

He has employed the method for four years. In none of the patients operated upon was there any apparent pain, and in older children and adults, where one could get an intelligent answer, this was plainly told. Gagging was the chief symptom complained of. No case showed hemorrhage five minutes after operation. Soreness of the throat after operation was present, although there was anesthesia lasting from two to eight days.

Quinin is the anesthetic, and urea, by means of its irritant properties, causes an edema which acts as a hemostatic.

Harris.